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THE FEDERAL ROLE IN WATER MANAGEMENT

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THE INQUIRY ON FEDERAL WATER POLICY

The Inquiry on Federal Water Policy was appointed by the federal Minister of the Environment in January of 1984 under the authority of the Canada Water Act. The members were Peter H. Pearse, chairman; Françoise Bertrand, member; and James W. MacLaren, member. The Inquiry was required by its terms of reference to review matters of water policy and management within federal jurisdiction and to make recommendations.

This document is one of a series of research papers commissioned by the Inquiry to advance its investigation. The views and conclusions expressed in the research papers are those of the authors. Copies of research papers and information on the series may be obtained by writing to the Enquiry Centre, Environment Canada, Ottawa, Ontario K1A 0H3.

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Abstract

This review assesses major federal legislation policies and programs related to water resource management in Canada, exclusive of its provincial-type role in Yukon and the Northwest Territories.

The constitutional setting is described, including its uncertainties highlighting the need for federal-provincial cooperation. Ten federal laws relating to water are examined and recommendations presented to improve the Canada Water Act, Environmental Contaminants Act and the Fisheries Act.

Major federal programs assessed include those related to water quantity and quality monitoring, planning, regulation, flood damage reduction, regional water development, Great Lakes water quality management, municipal facilities funding, toxic chemicals and airborne pollutants. Recommendations are presented to strengthen programs as appropriate.

Résumé

Ce rapport évalue les principaux programmes, politiques et législations fédéraux reliés à la gestion des ressources hydriques au Canada. Il n'aborde cependant pas le rôle du gouvernement fédéral dans les Territoires du Nord-Ouest et du Yukon.

Le contexte constitutionnel y est décrit et les incertitudes en résultant sont soulignées ce qui met en lumière la nécessité d'une collaboration fédérale-provinciale. Les lois fédérales se rapportant à l'eau sont examinées et des recommandations sont faites afin d'améliorer la Loi sur les ressources en eau du Canada, la Loi sur les contaminants de l'environnement et la Loi sur les pêcheries.

Les principaux programmes fédéraux évalués comprennent ceux reliés à la surveillance de la quantité et de la qualité des eaux, à la planification, à la règlementation, à la réduction des dommages causés par les innondations, au développement régional des ressources hydriques, aux grand lacs, à la gestion de la qualité des eaux, aux financement des équipements municipaux, aux substances toxiques et aux polluants aéroportés. Des recommandations sont présentées afin de renforcer ces programmes lorsque nécessaire.

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STUDY TERMS OF REFERENCE

REFERENCES

1. INTRODUCTION

1. INTRODUCTION

This review was undertaken for the Inquiry on Federal Water Policy. It attempts to outline and assess the federal government's roles in water administration as defined by its legislation, policies and programs. The study was based on interviews with senior staff of federal agencies directly involved with water management and documentation provided by them.

To set the stage, it seemed essential to describe the constitutional setting and the uncertainties it creates respecting federal and provincial jurisdictions. Within this setting, the major federal water legislation is summarized and recommendations are made to overcome deficiencies. The review then examines major federal water programs.

The report is restricted to a discussion of the federal government's national roles, excluding its provincial-type responsibilities exercised in Yukon and the Northwest Territories. The initial intention was to include a chapter on territorial water management, but in the end it was decided not to do so. The management of water in the North is too significant a topic to be included as a mere adjunct to a discussion of federal water policies. Water management policies and programs of the Department of Indian Affairs and Northern Development stand on their own, just as do those of a province, and should not be confused with "federal" water policies and programs. They are provincial-type rather than national. Through the courtesy of the Department of Indian Affairs and Northern Development, a separate report which I completed in 1984, "Water Policy North of 60°", is submitted to the Inquiry for its consideration.

Concentration on federal programs dealing with the more significant issues of the day turned out to be inescapable. As a result, a number of programs of importance are not discussed. The operation of the St. Lawrence Seaway, numerous control boards, investigative-engineering boards and advisory committees reporting to the International Joint Commission are examples of important programs that are not dealt with.

Since the Inquiry commissioned a separate study concentrating on federal water research programs, they are only considered here in relation to several water management issues rather than as programs in their own right.

Meaningful and comparable statistics on financial and personnel resources allocated to various programs were not usually available. Accounting systems differ from department to department and within departments they change on a too-frequent basis. Where obtainable, figures are included in the discussion of individual topics. Some general statistics are included in the Appendices.

The recommendations contained herein have been developed in recognition of the budgetary restraint situation confronted by all levels of government. No new major initiatives are proposed. Instead, the emphasis has been placed on fine-tuning, improving the coordination of programs, providing for stronger centres of authority and responsibility, and maintaining a state of readiness to respond to new issues as they arise.

2. CONSTITUTIONAL FRAMEWORK FOR WATER RESOURCE MANAGEMENT

2. CONSTITUTIONAL FRAMEWORK FOR WATER RESOURCE MANAGEMENT[1]

2.1 Introduction

Much has been written by legal scholars about the powers of the provincial and federal governments respecting water resources. Rather than attempt to present an exhaustive review, the following discussion outlines the major responsibilities of the governments in Canada, areas of uncertainty, and options available for resolving disputes and effecting cooperation.

2.2 Provincial Powers

Provincial powers derive from Sections 109 and 92 of the Constitution Acts of 1867 to 1982. Section 109 bestows the ownership of public lands, mines and minerals to the provinces. This has been interpreted to include the proprietary rights to rivers and other watercourses (Zimmerman, 1969), excepting those waters occurring on federal lands within the provinces. With proprietary rights to water and fish therein, the provinces can regulate the rights to use them within their respective territories, except for those rights that by common law are public rights, namely the right to navigate in virtually all waters and the right to fish in tidal waters.

Section 92 provides legislative powers to the provinces including: the management and sale of public lands; property and civil rights; local works and undertakings; and, generally all matters of a merely local or private nature in the province. Section 92A, added in 1982, provides the provinces with exclusive powers in relation to the development, conservation and management of sites and facilities for hydroelectric power generation.

Basically, as the owners of the rights to use water and with the power to regulate property, local works and undertakings, and matters of a local nature, the provinces are the water managers. They can determine its apportionment and regulate its quality to meet provincial, economic and social objectives. As all private business managers find, however, there are a number of constraints that have been placed on a province's water business. These constraints are found among the constitutional powers of the federal government.

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[1] This discussion excludes consideration of federal lands, including Yukon and the NWT where the federal government has full jurisdiction over water.

2.3 Federal Powers on Internal Provincial Waters

The two principal federal powers are those respecting two specific uses of watercourses, fisheries and navigation. In a sense, those responsible for fisheries and navigation are clients of the water managers. In another, and more realistic sense, fisheries is an industry with fish habitat as the resource base and fish the product. When looked at in this way, the federal government is the manager of a resource, fish habitat, that occurs within another resource, watercourses, that it does not own. Whether clients or managers, the requirements of the federal fisheries and navigation authorities must be met, even if they constrain or prevent a province from meeting the demands of customers for other water uses.

2.3.1 Fisheries

While the provinces possess the proprietary rights to their fish as they do for water, it is the federal government that controls the protection and conservation of fisheries under Section 91(12). These powers directly constrain other uses of watercourses. The federal government, for example, can regulate local works and undertakings to ensure the maintenance of fish passage and to protect spawning, rearing and other habitat areas from physical disturbance and pollution detrimental to fish.

2.3.2 Navigation

Section 91(10) gives the federal government exclusive legislative authority over navigation and shipping. It can control the design and construction of any structure that might interfere with navigation, regulate the deposit of rubble and other material that could interfere with navigation, and define waste disposal restrictions for ships and shipping facilities.

2.4 Indirect Powers

Besides these federal powers directly related to water, there are several indirect powers that could influence a province's authority over its internal waters. The statistics power (S. 91(6)), for example, is used as a basis for gathering various data on water supply, quality and use. Involvement in irrigation programs and the control of pollution affecting agriculture could be justified on the federal agriculture power. The criminal law powers of S. 91(27) might be employed to prohibit, or possibly regulate, pollution, although as Gibson (1973) points out, the courts have restricted federal jurisdiction under S. 91(27) to those activities "essentially criminal" in nature. It is unclear whether the control of pollution not seriously dangerous to public health, or the regulation rather than the prohibition of dangerous pollutants, could be dealt with under the criminal law power.

Although not defined in the Constitution Act, the federal government does employ its "spending power" to influence the exercise of provincial water management. Federal grants or resources committed to federal-provincial programs, such as the current flood hazard reduction programs, often contain conditions that steer the direction of provincial policies and priorities.

2.5 Federal Powers on Interjurisdictional Waters

In addition to these direct and indirect federal powers that may constrain a province's management of its internal waters, there are other federal powers that can influence activities within a province that could have impacts beyond the province's border, in the United States or in another province.

2.5.1 Treaty Power

Under Section 132, the federal government has all the powers necessary to fulfill Canada's obligations arising from international treaties made while Canada was part of the British Empire. Two treaties are of importance here. Under the Boundary Waters Treaty (1909), the federal government can take the steps necessary to protect open and free navigation and the maintenance of natural levels and flows of boundary waters, those waters that flow along or are part of the Canada-United States border, but excluding tributaries thereto. The Treaty also commits Canada to prevent pollution of both boundary waters and waters flowing across the boundary "to the injury of health or property" in the United States. This power would extend to the Great Lakes, part of the St. Lawrence and several major watercourses crossing or part of the border such as the Okanagan, Columbia, Souris, Saint John and St. Croix.

The second treaty of significance is the Migratory Birds Convention of 1916 designed to protect migratory birds, not only from excessive hunting but from other hazards such as water pollution. Authority to regulate pollution deleterious to migratory birds would apply anywhere in Canada frequented by migratory birds, virtually everywhere.

2.6 Federal Powers on Interprovincial Waters

Provincial authorities relate to things and activities internal to a province. As Canadian waters become more intensively used and plans proceed for further developments, actual and potential impacts on downstream provinces have grown in importance. Waste disposal in one province has caused problems in another. Storage dams have resulted in ecological damage downstream. Proposals to divert waters from one basin to another, to expand irrigation programs or build new hydroelectric installations have potential implications for downstream provinces and territories. Are there additional federal powers tailored to deal with such interprovincial issues?

The Constitution Act is silent on the specific issue, but there are federal powers that seemingly could be brought to bear to regulate activities in one province that could have injurious effects downstream in a neighbouring province or territory.

There is the declaratory power of Subsection 92(10)(c) under which the federal government may exercise jurisdiction over works within a province by declaring them to be for the general advantage of Canada or of two or more provinces. While the power is there, Percy (1984) points out that it has become a politically sensitive authority and has not been employed since 1961.

Subsection 92(10)(a) gives authority to Parliament to control works and undertakings that extend beyond the limits of a province. This power could be applied to regulate a proposed dam that would create a reservoir extending upstream into another province. It is unlikely, however, that the power could be applied to regulate the same project to prevent or minimize injurious impacts in a downstream province or territory. The opportunity to find out arose when British Columbia built the Bennett Dam on the Peace River, but the federal government did not act to influence the operation of the project or the schedule used to fill that reservoir.

Section 91 of the Constitution Act (1867), provides federal authority to legislate for the peace, order and good government of Canada on any matter not exclusively assigned to the provinces. The federal government carries out a variety of research programs under this authority such as those relating to the health effects of contaminants on drinking or recreational water. These are generally welcomed by provinces since the results of research have national applicability, save duplication of effort, and do not threaten provincial sovereignty.

But when does a problem reach the status of influencing the peace, order and good government of the nation to the extent that the federal government could exercise some regulatory powers? Gibson (1969 and 1973) took the view that the power could be used by the federal government to create multi-use river basin administrations or to settle interprovincial disputes, or to legislate the basis under which such disputes are to be settled. The applicability of the peace, order and good government power seems to depend, however, on the degree of national interest involved in a particular issue.

Chesman (1984) has outlined the situation. He points out that in a judgement respecting A.G. Ontario v. Canada Temperance Foundation (1964), (A.C. 193 at 205-206), the Privy Council spoke of a national concern to sustain the federal power. Quoting from Chesman, the judgement read in part that:

> "the true test (of the residual POGG power) must be found in the real subject matter of the legislation: if it is such that it goes beyond local or provincial concern or interest and must from its inherent nature be the concern of the Dominion as a whole ... Parliament, as a matter affecting the peace, order, and good government of Canada although it may in another aspect touch on matters specially reserved for the provincial legislature."

In a later case, however, know as the Anti-Inflation Reference (1976), 2S.C.R. 373 (S.C.C.), federal legislation was held to be valid under the peace, order and good government power because it addressed a matter of national emergency.

Chesman (1984) has outlined a logic for determining when the national concern or national emergency criterion would be most appropriate. First put forward by Lederman (1975), the argument outlines two situations for which use of the residual power would be appropriate. The first category would provide federal jurisdiction over specific subjects that are of national interest and have emerged since 1867. Aviation and atomic energy are two areas given as examples. The second category would call for federal jurisdiction over a situation that had reached the dimensions of a national emergency, something that justifies temporary assumption of authority pending solution of an issue.

It is notable that this is the approach that seems to have been used by the drafters of the Canada Water Act (1970). Part I of the Act deals with comprehensive water management programs. It provides for unilateral federal action for interjurisdictional basins where all reasonable efforts to reach agreement with provinces have failed and where there is a significant national interest. For interprovincial basins, however, the unilateral action provision extends only to planning activities. Only for international basins, where Parliament has firm authority through the Boundary Waters Treaty, does the Act provide for unilateral federal implementation of planned projects.

Part II of the Canada Water Act provides for the establishment of water quality management agencies to plan and implement programs to restore, preserve and enhance water quality in designated areas. Part II provides for unilateral federal action when federal/provincial agreements cannot be reached but, unlike Part I, the provision extends to the actual implementation of programs. Part II, however, is only applicable in situations that have become of urgent national concern.

In 1978, the federal government published its interpretation of "significant national interest" as follows:

> "'Significant national interest' includes, but is not limited to, areas of direct federal responsibility. Examples of cases of significant national interest would include the management of boundary and international waters, interprovincial waters, waters in Indian reserves, national parks and the Territories; issues involving other federal waters, cases where federal jurisdictions, such as fisheries or navigation are major concerns; or such

> other cases as are deemed by the Ministers to be of sufficient importance to the people and economy of Canada as to require federal involvement, e.g. disruption of regional economies by major floods." [1]

It would appear then that the federal government might be inclined to formulate comprehensive water management plans for interprovincial waters should provinces not agree to joint planning.

The course the Supreme Court of Canada might adopt in dealing with interprovincial water disputes would, of course, depend on the specifics of a case presented to it. While there has been no case of unilateral federal action under the Canada Water Act, and no water disputes brought before the Court involving two provincial governments, there has been private litigation. A recent case yields insights into the constitutional frustrations the Court would have to deal with should a downstream province launch an action against its upstream neighbour or should provinces object to a unilateral federal approach under the Canada Water Act.

In 1975, the Court dealt with a case involving Interprovincial Co-operatives Ltd. v. the Queen in the Right of Manitoba. The problem concerned provincially licensed chlor-alkali plants in Saskatchewan and Ontario whose effluents contained mercury that found its way downstream into Manitoba waters and contaminated fish. Closure of a commercial fishery in Manitoba caused losses in the fishing industry. Manitoba sued Interprovincial Co-operatives Ltd. on behalf of the fishermen.

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[1] Environment Canada, 1978. A vital resource: federal policy statement on inland waters. Ottawa.

The heart of the issue was whether or not a province, in this case Manitoba, has the power to legislate respecting the quality of water entering the province. That is to say, could Manitoba's law influence pollution control requirements in Saskatchewan and Ontario? Similarly, it could have been asked whether or not Saskatchewan and Ontario have authority to license waste disposal in a way that caused injury in Manitoba. As Percy (1983) pointed out, "the crucial issue is whether the tort is legally considered to have been committed in the jurisdiction in which the act took place or in the jurisdiction where the harm was suffered".

In the course of their comments, several of the Supreme Court Justices made statements bearing on the roles of upstream provinces, downstream provinces and the federal government in the management of inter-provincial waters. These quotations are taken from the Dominion Law Reports (Vol. 33, Sd) (S.C.C.).

Laskin commented that:

> "It is plain enough to me that a Province having rights in property therein (fish) is entitled to protect those rights against injury, and similarly, to protect the interests that others may have in that property, by bringing or authorizing actions for damages ..." (p. 335)

But since a province's authority to legislate within the powers defined in S. 92 of the Constitution Act is restricted to matters within its boundaries, how can a province protect itself from pollution or reduced streamflow caused by actions taken in an upstream province?

Ritchie argued that:

> "... if there were licences making the appellant's activities in Saskatchewan and Ontario justified, this not only gave rise to the civil rights under the law of those provinces, but to a concomitant civil right to have those licences recognized in the Courts of Manitoba." (p. 349)

On the other hand, Laskin's view was that:

> "If ... they are respectively licensed to discharge contaminants to the extent that they did, that licence, local in each of the provinces, does not have an extra-territorial reach to entitle each of them with impunity to send their pollutants into the waters of another province." (p. 338)

And Pigeon said that:

> "It appears to me equally impossible to hold that Saskatchewan and Ontario can license the contaminant discharge operations so as to preclude a legal remedy by those who suffered injury in Manitoba, or to hold that Manitoba can, by prohibiting the discharge of any contaminant into waters flowing into its territory, require the shutting down of plants erected and operating in another province in compliance with the laws of that province." (p. 359)

Several of the judges took the view that interprovincial issues relating to pollution control were matters of federal rather than provincial jurisdiction. Chief Justice Laskin commented that:

> "... if any regulatory authority to have interprovincial effect is to exist in respect of pollution of interprovincial waters it would have to be established under federal legislation." (p. 358)

Ritchie stated that:

> "Legislation in respect of water quality and of pollution, including the permitting thereof in interprovincial rivers, is clearly within the exclusive legislative authority of the Parliament of Canada under S. 91(12), whereas provincial legislation dealing exclusively with the effect of pollution including the proof thereof and

> the measure of damage resulting therefrom, has controlling effect within the territorial limits of the province by which it is enacted." (p. 346)

Pigeon stated that:

> "The basic rule is that general legislative authority in respect to all that is not within the provincial field is federal." (p. 357)

The range of comments must give both the provinces and the federal government pause for thought. In a future case, the Court might rule that a province's exclusive right to regulate use of its internal waters is limited by the riparian rights of downstream provinces. Alternatively, the Court might modify strict riparian principles and adopt rules providing for some degree of reasonable use by upstream provinces with its affects downstream being considered acceptable. Whether or not the Court would uphold federal regulatory involvement, would depend on its interpretation of the nature of the issue, be it of national concern, or national emergency; but some of the judicial comments quoted above suggest the Court may be leaning toward a federal role. The uncertainties are such that clarification at the political level is required. What options are there?

2.7 Clarifying the Federal Role

2.7.1 Federal Legislation

Any attempt by the federal government to assert power to regulate water flows or quality at interprovincial boundaries would undoubtedly be met with strong opposition by the provinces, unless an issue of national emergency were involved. The reason for provincial opposition is obvious. Federal controls at border points could have far reaching effects on a province's powers to manage its water far upstream from its border.

The nature of the Canada Water Act recognizes these potential issues and indicates a federal unwillingness to attempt to assert regulatory powers over interprovincial waters except in the unlikely event of national emergencies.

Instead of attempting to legislate itself a regulatory role, the government might adopt a more passive role. Since there could be procedural difficulties in determining which court should hear a dispute between two provinces, the federal government might act to clarify the situation. Section 19 of the Federal Court Act already provides for that court to hear interprovincial disputes, with appeal to the Supreme Court, should provinces legislate accordingly. All have done so with the exception of Nova Scotia and Québec. It is within the realms of possibility, however, that a province engaged in a dispute as defendant could legislate itself out of the arrangement in an attempt to avoid litigation. In such a situation, the federal government might be able to legislate compulsory jurisdiction of the Federal Court to overcome a dilema of national concern. Gibson (1973) believed such action would be supportable under the peace, order and good government power.

While legislating the authority of a particular court could obviate procedural problems, it would not assist that court in determining the principles on which to base its decisions. The uncertainties present today would persist, at least until several interprovincial disputes had been ruled upon. But if the federal government were to attempt to incorporate such guidelines in law, it would undoubtedly be challenged with attempting to tamper with provincial rights. In the end, the pursuit of federal legislation to deal with interprovincial water management issues does not seem to offer useful solutions.

The only option left is cooperation through federal/provincial agreements or perhaps ideally through Constitutional amendment to set the guidelines for such cooperation.

2.7.2 Interprovincial/Federal Agreements

The very nature of Canada has led to the negotiation of federal/provincial agreements to deal with a whole range of issues that have emerged over the years, varying from medicare to regional economic development and water resource management. Some of these agreements provide insights into basic principles acceptable to governments that should be useful to guide the development of future cooperative arrangements.

The most pertinent example of interjurisdictional water management arrangements in Canada are the Apportionment Agreements between Alberta and Saskatchewan, Saskatchewan and Manitoba, both covered by the Master Agreement on Apportionment involving three provinces and the federal government. The interprovincial agreements provide for the sharing of natural flows of streams flowing eastward from province to province; cooperation for effecting the most economical and beneficial use of interprovincial waters; and, the settlement of disputes by the Federal Court.

The Master Agreement gives effect to the interprovincial agreements, provides for their amendment or cancellation, and reconstituted the Prairie Provinces Water Board to administer the agreement. The Master Agreement adds the important dimension of water quality to the extent that the governments agreed to consider quality problems, refer them to the Board, and consider the Board's subsequent recommendations.

A key principle pervading these agreements is that the sovereign power of each province to manage its internal waters is maintained, constrained only by the agreed apportionment. How a province is to meet its obligations at the border is left up to it.

The first emphasis is on assuring each province its share of the resource for its internal development and use according to its own priorities.

With shares assured and development priorities protected, the provinces adopted the principle of fullest cooperation on the integrated development and use of water and related resources.

Complementing the continuing integrity of provincial powers is the role adopted by the federal government. The federal government plays the role of convenor and honest broker, providing the chairmanship of the Board and undertaking the required stream monitoring as an objective third party.

Through the agreements, the federal government gains an element of clout in that the agreements cannot be amended or cancelled except with the consent of all four governments.

The background that led to the adoption of these basic principles has been well described by Barton (1983). Basically, after some years of operation as an advisory board examining and recommending on water use proposals in each province, it became apparent that water development apportionments granted to one province could constrain some future developments in another province. A need was felt for each province to have some guarantee of supply regardless of when the real demand for use might arise. With this realization, the two upstream provinces concluded an apportionment agreement between themselves and Saskatchewan and Manitoba worked out a similar agreement. Lastly, the Master Agreement incorporated the first two and added the federal government as the fourth party. Adoption of similar principles protecting a province's or territory's basic sovereignty in water management and protecting its future supplies for development at its own pace will undoubtedly be required as a prerequisite for cooperation agreements on other interprovincial basins.

2.7.3 Constitutional Amendment

With the exception of three Atlantic Provinces, all provincial and territorial water management options are subject to influences of activities in an upstream or neighbouring province. All provinces and territories are subject to water quality problems resulting from the long-range transport of air pollutants. Perhaps the time is ripe to consider development of an accord involving all provinces, territorial and the federal government incorporating objectives and management principles to protect the interests of each and encourage cooperation among all. If such could be accomplished, a practical goal would be to incorporate it in the Constitution.

There is much experience to draw on. For example, while the particular apportionment formula selected by the prairie provinces could not be expected to be appropriate for other river systems, the Prairie Provinces Water Board has moved forward on water quality questions and has produced a set of general quality objectives that could prove useful for other interprovincial waters. In 1973, the Board agreed on a set of general water quality objectives based on a "universal user" concept and not taking account of the individual characteristics of individual streams. These objectives, currently under review for possible amendment, would have application in other basins.

In 1983, the Board produced both general and specific water quality requirements for the Alberta/Saskatchewan crossing of a specific river, the Beaver. The general requirements at least should have applicability elsewhere.

Under the aegis of the Canadian Council of Resource and Environment Ministers, the provinces and federal government are developing a set of water quality guidelines for adoption on a national basis.

There are a variety of other federal/provincial agreements on different basins relating to Canada's international obligations under the Boundary Waters Treaty. The Canada/Ontario Agreement Respecting Great Lakes Water Quality (1971 and 1982) contain a set of principles respecting water quality management. The Canada/Québec/Ontario Respecting Ottawa River Basin Regulations (1983) contain principles to guide the regulation of flow for flood protection while maintaining the interests of hydroelectric production and other uses. These are the two most recent of a number of federal/provincial agreements on aspects of interjurisdictional water management.

In the United States, the courts have settled a variety of interstate disputes, creating a body of principles on equitable apportionment along the way. The United Nations International Law Commission has made progress in enunciating principles respecting the non-navigational use of international watercourses. Perhaps it is time for provincial and territorial water managers to take a look at what has already been done in Canada and elsewhere and see if they could develop a set of interprovincial water management principles unique to the Canadian situation.

In the meantime, we are left with the provinces as the owners/managers of their internal waters constrained by the fisheries power to legislate management of the same resource as fish habitat, the federal power over navigation, the federal powers respecting boundary and international waters, and less well defined powers over interprovincial water management.

3. FEDERAL WATER LEGISLATION

3. FEDERAL WATER LEGISLATION

3.1 Introduction

Within the constitutional setting outlined in Chapter 2, the federal government has enacted a variety of laws over the years to fulfill its responsibilities. With two notable exceptions, these laws are of a narrow regulatory nature designed to prohibit or control activities that could have detrimental effects on navigation, fish populations, health and the natural environment.

Only the Canada Water Act and the Northern Inland Waters Act provide for a positive comprehensive management approach aimed at the optimization of benefits from Canada's water resources. Interestingly, both were debated and passed during the same session of Parliament in 1969-70.

There are at least 10 acts that bear directly on water quality. These include, at one end of the spectrum, the very general provisions of the Department of Health and Welfare Act that simply state that the duties and powers of the Minister extend to and include all matters relating to the promotion and preservation of health of Canadians (S. 5). In contrast, Part II of the Canada Water Act defines a detailed organizational and methodological approach to water quality management (presented in such a way, however, that it is not likely to be used). In between are a number of regulatory acts dealing with certain categories of pollutants such as nuclear wastes and other persistent toxic chemicals. Only one act provides specifically for the control of a broad range of pollutants, and the purpose of that act is to protect fish rather than man.

The following sections outline the major provisions of the more significant legislation related to water together with comments on the adequacy of the approach.

GOVERNMENT ORGANIZATION ACT (1979)
PART III
Department of the Environment

Purpose

To define the general responsibilities of the Minister of the Environment.

Provisions

Section 14 repeals Sections 5-7 of the Organization Act of 1970 and substitutes:

Section 5 defines the powers of the Minister to include:

> "(a) all matters over which Parliament ... has jurisdiction, not by law assigned to any other ... relating to:
>
> (i) the preservation and enhancement of the quality of the natural environment, including water, air and soil quality,
> (ii) renewable resources, including ... migratory birds,
> (iii) water,
> (iv) meteorology,
> (v) ... the enforcement of any rules or regulations made by the International Joint Commission ... as far as they relate to the preservation and enhancement of the quality of the natural environment,
> (vi) the coordination of the policies and programs of the Government ... respecting the ... quality of the environment."

Section 6(1) defines duties the Minister shall undertake in relation to his powers outlined in Section 5, including:

> "(a) initiate, recommend and undertake programs and coordinate programs of the Government ... designed
>
> (i) to promote establishment or adoption of objectives or standards relating to environmental quality, or to control pollution,
> (ii) to ensure that new federal projects ... are assessed early in the planning process for potential adverse effects on the quality of the natural environment and that a further review is carried out of those ... probable to have significant adverse effects,
> (iii) to provide ... Canadians ... information.
>
> (b) promote ... practices ... leading to the better preservation and enhancement of environmental quality, and cooperate with provincial governments ... or persons ...
>
> (c) advise ... agencies of the Government on all matters pertaining to ... quality of the environment."

Section 6(2) authorizes the Minister to ...

> "by order, with the approval of the Governor in Council, establish guidelines (respecting environmental quality) for use by departments, boards and agencies of the Government and by (Crown) corporations and regulatory bodies."

Section 6(3) authorizes the Minister, with Governor in Council approval, to enter into agreements with the provinces.

Comment

The Act gives the Minister of the Environment the major federal role with respect to water and measures to control environmental quality factors that could directly or indirectly affect water quality. The Act does not go to the extent, however, of requiring that all federal projects conform to environmental requirements of the Minister. Reticent agencies may only have compliance pressures applied to them through the issuance of guidelines by the Minister, on the approval of the Governor in Council.

In times of economic stress, the pressures to minimize costs may place environmental quality considerations in jeopardy with the Minister of the Environment but one among equals in a large Cabinet. In the interests of environmental quality maintenance and of assuring that all federal water related projects optimize the use of water, new legislation is desirable to require that federal projects, programs and activities likely to have significant environmental effects be subject to environmental assessment and approval of the Minister of the Environment.

CANADA WATER ACT (1970)
(Department of the Environment)

Purpose

"To provide for the management of the water resources of Canada including research and the planning and implementation of programs relating to the conservation, development and utilization of water resources."

The Act was based on perceptions that:

(a) demands on water resources were increasing rapidly and more knowledge was needed concerning their supply, demands thereon and the means for meeting the demands;

(b) pollution had become a significant threat to health, well-being and prosperity of Canadians, and that it had become a matter of urgent national concern that measures be taken in areas most critically affected; and,

(c) comprehensive programs in cooperation with the provinces were required for research and planning of water resources to ensure their optimum use.

Provisions

PART I
COMPREHENSIVE WATER RESOURCE MANAGEMENT

Section 3 authorizes the Minister to enter a variety of consultative, advisory and coordinative arrangements with provinces on national, regional or river basin bases.

Section 4 authorizes federal/provincial programs related to inventory, data collection, research, comprehensive management planning, project design, and the implementation of plans and projects.

Section 5 provides for unilateral federal action for all or some of the functions outlined in Section 4 depending on specified conditions.

The complete range of activities is authorized for federal waters, such as in the northern territories.

Limited authority is provided for direct involvement in interprovincial, boundary and international waters where all reasonable efforts to reach federal-provincial agreements fail. For interprovincial waters, Governor in Council authority may be provided for the preparation of comprehensive management plans and the design of projects, but not their implementation. For boundary and international waters, the authority may be extended to include the implementation of plans or projects.

Section 6 provides general authority for water research, data and inventory programs.

Section 7 outlines provisions to be included in federal-provincial agreements including the sharing of assignments and costs.

PART II

WATER QUALITY MANAGEMENT

Except for federal waters, Part II applies only to waters where water quality management has become a matter of urgent national concern (S. 9(a)).

Sections 9 and 13 authorize federal-provincial agreements to designate water quality management areas and to procure the incorporation of water quality management agencies to plan and carry out programs to: determine the nature and quality of current and anticipated wastes; recommend water quality standards; the kinds and amounts of wastes that may be deposited; treatment requirements; effluent discharge fees; and, waste treatment charges.

On approval of a water quality management plan by ministers of the governments involved, a water quality management agency may be authorized to: design, construct and operate waste treatment facilities; collect waste treatment fees and effluent discharge fees; monitor water quality; inspect treatment plants; and, do such other things necessary for effective water quality management (S. 13).

Section 8 prohibits the deposit of wastes within water quality management areas except as prescribed for that area and with payment of any prescribed effluent discharge fees.

Section 11(1) provides for unilateral federal action on interjurisdictional waters of urgent national concern when all reasonable efforts to effect federal-provincial agreements have failed, or when such agreements are terminated on disagreement over water quality standards. The unilateral action may encompass all the functions outlined in Section 13 for agencies set up under federal-provincial agreements.

Section 11(2) provides for designation of water quality management areas and the incorporation of agencies for federal waters.

Section 16 authorizes the making of regulations for water quality management areas on the recommendation of the agency or jointly by the ministers who are parties to a federal/provincial agreement. Among other things regulations may cover: quantities of waste that may be discharged; water quality standards; waste treatment charges; and, effluent discharge fees.

PART III
NUTRIENTS

Part III relates to the regulation of cleaning agents and water conditioners containing nutrients that could promote aquatic plant growth and degrade the usefulness of water to man, or to animals, fish or plants useful to man.

Section 18 prohibits the manufacture or import of cleaning agents or water conditioners containing prescribed nutrients in concentrations greater than prescribed.

Section 19 allows regulations prescribing nutrients and their maximum concentrations in cleaning agents and water conditioners.

Section 20 authorizes seizure of these products believed to be in violation of the regulations.

PART IV
GENERAL

Sections 23 and 24 provide for inspectors and analysts and their duties.

Section 26 authorizes the Minister to appoint advisory committees.

Section 27 gives general authority to the Minister to publish information on the conservation, development and use of water resources.

Section 36 requires submission of an annual report to Parliament on operations under the Act.

Sections 22 to 24 relate to offenses. Anyone who deposits wastes in violation of regulations under Section 18 or who manufactures or imports cleaning agents or water conditioners in violation of regulations under Section 18 is liable to a fine up to $5,000 for each day the offense is committed.

Comment

The Canada Water Act introduced the concept of comprehensive multiple use water management to federal legislation. It supplanted the Canada Water Conservation Assistance Act under which the federal government could contribute 37.5 percent of the cost of works built for water conservation. It had been used primarily to support the construction of flood control works.

Part I of the Act permits federal cooperation with provinces in a full range of research, planning and project implementation where there is significant national interest.

The title of Part II, Water Quality Management, is unfortunate for two reasons. It incorrectly implies that water quality management is excluded from the programs authorized in Part I, and it implies that the only approach permitted under the Act is the unique detailed water quality agency concept defined in Part II.

Part II introduces the concept of incorporated agencies to manage water quality on a user-pay principle. Except federal waters, however, the approach is only applicable in areas where water quality has become a matter of urgent national concern.

When the Canada Water Bill was introduced in Parliament in 1969, some provinces felt that Part II was an affront to their pollution control programs and a threat to their jurisdiction over water. While Part II could be applied to any federal waters, it could only be applied to provincial waters the quality of which had become of urgent national concern. Since there were no water quality problems of note in the North, did this mean the federal government was about to decide that there were urgent national problems in provincial waters?

Section 11 added a double-barreled threat of unilateral action. Not only was the federal government authorized to take unilateral action on interjurisdictional waters should all reasonable efforts to obtain federal-provincial agreements fail, the unilateral action threat was present even if provinces were to enter agreements under Part II. Should such an agreement be terminated because of a failure of governments to agree on recommended water quality standards, the federal government could take over, so to speak. This provision effectively eliminated any prospect of provinces entering water quality management agreements under Part II of the Act.

Since Part II of the Act defines a specific approach to water quality management, it may well be that the same approach could not be incorporated in a federal-provincial agreement under the provisions of Part I which are less threatening to provincial sensitivities. This is unfortunate, since the management concepts contained in Part II offer promise of bringing economic pressures to bear on the producers of waste.

A further criticism of Part II is that it is reactive, being applicable to interjurisdictional waters only when water quality has deteriorated to the extent that it has become of urgent national concern. This is in contrast to Part I that stresses a forward-looking planning approach to optimize benefits.

> IT IS RECOMMENDED that Part II of the Canada Water Act be revised to extend its applicability to areas where water quality is of significant national interest. The provision for unilateral federal action should not be similarly extended.

Adoption of this approach may require the use of provincially incorporated agencies rather than federally incorporated ones to ensure that an agency's regulations would be held valid by the courts.

Part III of the Act relating to the control of the manufacture or import of cleaning agents and water conditioners was aimed directly at controlling the phosphate contents of laundry detergents that, at the time, had been identified as a major causal factor of eutrophication of the Great Lakes.

Once the Act came into force, an appropriate regulation was made. It was not until 1976 that federal regulation of other pollutants of significant national concern, such as persistent toxic substances, became possible under the Environmental Contaminants Act. With the availability of that Act, new regulatory powers over manufacturing, processing or importing of substances containing pollutants are not required under the Canada Water Act.

ENVIRONMENTAL CONTAMINANTS ACT (1976)

(Departments of Environment and National Health & Welfare)

Purpose

The purpose of the Act is to protect human health and the environment from substances that contaminate the environment.

Provisions

Section 3(1) provides for importers, manufacturers or processors of substances or classes of substances to provide the Minister with data on the amounts involved, following publication of a notice by the Minister.

Section 3(3) permits the Minister of the Environment or Minister of National Health to undertake research and make recommendations on substances suspected of entering the environment that may constitute a danger to human health or the environment.

Section 3(4) allows the two ministers to appoint committees respecting measures to control any substance or class thereof, in the environment, to provide advice and to publish reports and recommendations.

Sections 3(6) and (7) encourage cooperation with other federal departments and other governments.

Section 3(8) provides for agreements with provinces to conduct investigations on substances suspected to constitute a danger to health or the environment.

Section 4 provides for the Ministers of the Environment and National Health and Welfare to take certain actions when they believe a substance is entering the environment, or will, in an amount, concentration, or under conditions that they believe constitutes a significant danger to human health or the environment. They may:

- publish notice requiring anyone using the substance, or class thereof, in commercial, manufacturing or processing activities to notify the Minister of the Environment;
- require information on the substance, or class thereof, from the user; and,
- require importers and manufacturers of the substance or any product containing it to conduct tests specified by the Ministers.

Section 4(6) requires first time manufacturers and importers of chemical compounds in amounts greater than 500 kilograms to notify the Minister of the name of compound, the amount manufactured or imported and information respecting any danger to human health or the environment.

Section 7(1) provides for a formal schedule of substances, or classes thereof, that the two ministers believe are entering the environment, or will, in quantities, concentrations or under conditions that constitute a significant danger to Canada or an area thereof.

Section 8(1) prohibits release into the environment, in the course of commercial, manufacturing or processing activities, of substances on the schedule except in accordance with regulations made under Section 18, including:

- the maximum quantity or concentration that may be released;
- conditions under which there may be no release; and,
- geographical areas where the substances may not be released

Section 8(2) prohibits for commercial, manufacturing or processing uses the import, manufacture, process, sale or knowing use of substances on the schedule in Canada, or in geographical areas prescribed by regulation under Section 18.

Section 8(3) exempts from the strictures of S. 8(2) materials that include scheduled substances adventiously and in a quantity or concentration consistent with good manufacturing practices.

Section 8(4) prohibits the import, manufacture or knowing sale of products containing a scheduled substance in a quantity or concentration exceeding the prescribed maximum.

Section 8(5) provides for fines up to $100,000 or two years imprisonment for contraventions of Section 8.

Section 5(1) requires the Ministers of the Environment and National Health and Welfare to offer to consult with provinces and other federal agencies before recommending the addition of a substance to a schedule to regulate its release, import, manufacturing, processing and content in products. The purpose of consultation is to determine whether provinces will take appropriate action to eliminate the perceived danger to human health and environment.

Section 5(2) requires the Minister of the Environment to publish proposed orders and regulations so that objections may be filed (S. 5(3)).

If objections to proposed orders and regulations are filed, the Ministers are required under Section 6 to set up Environmental Contaminants Boards of Review to inquire into the nature and extent of the danger posed by the substance in question, hear representations from interested parties, and submit a report with recommendations to the Ministers. The report must be published.

Section 7(3) provides for by-passing the consultation process in emergencies, although provision is made for the filing of objections (S. 7(4)) and appointment of Boards of Review as required (S. 7(5)).

Sections 9 and 10 make appropriate provisions for analysts and inspectors and their authority.

Sections 11, 12 and 13 provide for seizure, retention, return or forfeiture of contaminant substances.

Regulations

To date, five substances or classes of substances have been placed on the Schedule and are regulated. These are: Chlorobiphenyls (PCB's), mirex, polybrominated biphenyls (PBB's), polychlorinated terphenyls (PCT's), and chlorofluorocarbons (CFC's).

Comment

Unlike the Pest Control Products Act that requires manufacturers of new pesticide formulations to seek registration of their products before they may be sold and used in Canada, the Contaminants Act places the onus for action on government. The Ministers of the Environment and National Health and Welfare must come to the belief that a substance is entering the environment, or will do so, in a manner that they believe constitutes, or will constitute, a significant danger to human health or the environment (S. 4). Only then can they require importers or manufacturers to conduct tests to determine the safety of a product so that a judgment may be made concerning its use in Canada. Furthermore, manufacturers and importers are not required to report their use or sale of new substances unless more than 500 kilograms are involved on an annual basis (S. 4(6)). It is conceivable, therefore, that significant amounts of persistent toxic substances could build up in the environment unnoticed over a period of years.

It is probable that the Act was drafted in this fashion with the knowledge that a comprehensive product approach process would impose long delays on the use of new chemicals and would undoubtedly overwhelm the limited toxicological resources of the government. The adopted approach does, however, accept a risk -- a risk that government scientists will suspect the dangers inherent to the use of certain classes of chemicals, require appropriate testing, and impose indicated controls before significant danger to the environment or human health occurs.

It would seem appropriate at this stage to place the full responsibility for signalling risks and proving the health and environmental safety of chemical substances on the industrial and commercial users. Such a step would more fully reflect the government's objective of protecting environmental quality and to have the user pay to maintain that quality. It would also bring the Contaminants Act more in line with the Pest Control Products Act.

> IT IS RECOMMENDED that the Environmental Contaminants Act be revised to establish a chemical substances registration process under which anyone planning to engage in any commercial, manufacturing or processing activities involving chemical substances new to Canada would be required to notify the Minister of the Environment and to conduct appropriate tests to determine its safety to human health and the environment, upon which registration decisions may be based. The new Act should also provide for the evaluation and registration of chemical substances already in use.

INTERNATIONAL RIVER IMPROVEMENTS ACT (1955)
(Department of the Environment)

Purpose

To provide for the regulation of construction, operation and maintenance of works on international rivers that would alter natural flows and interfere with use of the rivers outside Canada.

Provisions

Section 3 provides for regulations respecting the construction, operation and maintenance of international river improvements, the licensing thereof, and the exempting of any works from the operation of the Act.

Section 4 specifies that a licence is required to construct, operate or maintain an international river improvement.

Section 5 makes it an offense to violate the Act or any regulation with a penalty of up to $5,000 or five years imprisonment, or both for conviction on indictment or up to $500 and/or six months on summary conviction.

Section 6 authorizes the Governor in Council to order any international river improvement in violation of the Act or regulations forfeited to Canada and removed, destroyed or otherwise disposed of, with the costs involved being recoverable from the owner.

Section 7 exempts works constructed under a federal Act, situated within boundary waters, or built solely for domestic, sanitary, irrigation or other similar consumptive uses.

Section 8 binds the provinces.

Section 9 notes the applicability of provincial laws as long as their provisions are not in conflict with this Act.

Comment

This Act was passed when Canada found itself confronted by the Government of British Columbia that did not wish to await the Columbia River studies (IJC) and proposed to build a major dam on the Columbia River for a purpose not thought to be in the best interests of Canada.

LaForest (1968) felt that constitutional justification for the Act probably rests under the peace order and good government power since obstruction or diversions of international rivers could cause serious international incidents involving the country as a whole. He noted that the approach is

> "reinforced by other doctrines tending to take out of provincial control any matters affecting the nations sovereignty." (p. 344)

The exclusion of irrigation works from the provisions of the Act is interesting since such works could certainly alter natural flows and interfere with the downstream use of a river in the United States. It is probable that political pressures resulted in this exclusion to limit the range of applicability of an Act that was in fact aimed at one particular proposed storage reservoir.

The Act appears to be further limited in not applying to water quality issues.

MIGRATORY BIRDS CONVENTION ACT
(Department of the Environment)

Purpose

To ratify and implement the Migratory Birds Convention with the United States.

Provisions

Section 4(1) provides for the making of regulations "to protect the migratory game, migratory insectivorous and migratory nongame birds...".

Regulations

One regulation provides that

> "No person shall knowingly place, cause to be placed or in any manner permit the flow or entrance of oil, oil wastes or substances harmful to migratory waterfowl into or upon waters frequented by migratory waterfowl or waters flowing into such waters or the ice covering such waters."

Comment

The articles of the Convention define migratory birds, close hunting seasons, special provisions for wood and eider ducks, taking of nests and eggs, export prohibitions, and provisions to kill protected birds under extraordinaty conditions. No references are made to pollution or the regulation thereof. The Act does, however, provide regulatory authority for "any purpose that may be deemed expedient for carrying out the intention of this Act and the said Convention". These, however, must be subject to the terms of the Convention.

FISHERIES ACT (1867-1978)
(Department of Fisheries & Oceans
Department of the Environment: Section 33)

Purpose

To provide for the protection and conservation of fisheries.

Provisions

Three important sections of the Act are directly related to fish habitat protection. Section 20 deals with obstructions to fish passage. Section 31 deals with protection of habitat from physical disruption, while Section 33 relates to the deposit of deleterious substances in water. Section 34 provides for regulations.

Section 20 authorizes the Minister to require the construction, operation and maintenance of fishways or canals around dams or other obstructions. Where fishways are inappropriate, the owner of a dam may be required to provide funds for the construction and operation of hatcheries for maintaining the annual return of migratory fish.

The Minister may order the removal of unused obstructions and recover the costs of removal.

Section 31 provides that "no one may carry on any undertaking that results in harmful alteration, disruption or destruction of fish habitat" unless approved by the Minister or by regulations under the Act.

Habitat is defined broadly to include spawning, nursery, rearing, food supply and migratory areas depended upon by fish directly or indirectly.

Fines of up to $50,000 for a first offense and up to $100,000 for suceeding offenses are provided for.

Section 33.1(1) authorizes the Minister to require submission of plans of work and information relating to the fish habitat likely to be affected by a proposed activity. The Minister may require modifications to the plans to meet fish habitat requirements, but shall first offer to consult with interested provinces and federal agencies.

Sections 33(1) and (2) prohibit the deposit of deleterious substances "in water frequented by fish, or in any place or manner where such deleterious substances ... may enter such waters", unless in conformance with regulations under the Fisheries Act or other federal Act.

Penalties of up to $50,000 for a first offense and up to $100,000 for succeeding offenses are provided for. The owners of the deleterious substance deposited are liable for any consequent loss of income by commercial fishermen.

Section 33(11) defines deleterious substances broadly to include any substance or water containing a substance, or heated water, that if added to a watercourse would be harmful to fish.

Regulatory authority is provided to exempt certain deleterious substances from deposit in specified waters, in specified quantities or concentrations and under specified conditions.

Section 33.1(1) authorizing the Minister to seek plans of proposed undertakings and to order changes therein applies with respect to the deposit of deleterious substances as it does to habitat disturbance.

In addition to providing for inspectors and their powers, Section 33.2 requires the reporting of spills or imminent spills of deleterious substances into waters and requires the owner or operator to take all reasonable means to prevent or counteract any spill that does occur.

Again, fines are stipulated for those failing to submit requested plans and reports or failing to carry out undertakings in accordance with approved plans.

Regulations

(a) Deleterious Substances

Effluent quality regulations have been prescribed for the pulp and paper; chlor-alkali; petroleum refining; metal mining; potato processing; and, meat and poultry products industries.

(b) British Columbia Gravel Removal Order,

This regulation prohibits the removal from or disturbance of gravel in spawning grounds frequented by fish without a permit.

(c) Fishway Obstructions Removal Regulation,

This regulation provides for the removal of any natural or casual obstruction interfering with the free passage of fish.

Comment

The Fisheries Act suffers in that it deals with only one component of natural resource management, the punitive regulatory component. There are no provisions for habitat inventory, planning habitat requirements, or development. This is a major deficiency since fish habitat is a resource within a resource, the water resource, from which man makes many demands in addition to the propagation of fish. While the restrictive approach of the Fisheries Act can protect fish habitat from man's non-fisheries uses to a certain extent, it cannot yield appropriate management of the resource in concert with man's other demands. By its very nature, the restrictive approach becomes a rearguard action, unless it were assumed that fish production was the country's pre-eminent demand on water resources. The restrictions could be so numerous as to prevent many other water uses.

Some federal legislation does in fact suggest that the welfare of fish takes procedence over man. The Northern Inland Waters Act (NIWA) provides in Section 3(3) that none of its provisions or regulations or licences issued under it may authorize the alteration, diversion or storage of water in contravention of provisions of any other Act. Essentially, such provisions install the Minister of Fisheries as the judge over water resource development and use.

These provisions along with the lack of recognition in the Fisheries Act of multiple or integrated resource management sometimes place fisheries officers in difficult confrontations with the proponents of other water uses, and with federal and provincial agencies with other responsibilities. For instance, the legislated objective of the territorial water boards under Section 9 of the NIWA is to provide for the conservation, development and use of water in a manner that will yield optimum benefits. Obtaining that objective will at times be detrimental to fish habitat.

The problem is one of objectives -- whether or not the overall objective is to benefit man. If it is, it should be possible to make fish habitat management compatible with other aspects of water resource management.

Looking back to 1867, when responsibilities for fisheries and navigation were vested in the federal government, it is evident they were so assigned because of national importance to Canadians at the time, for their commercial and subsistence uses. The definition of "deleterious substance" in Section 33(11) is not as clearly supportive of man's benefit as the end objective of fisheries, but at least he is mentioned. The definition talks of degradation of the quality of water "so that it is rendered ... deleterious to fish or fish habitat, or to the use by man of fish ...".

The definition of "waste" found in the Canada Water Act and the Northern Inland Waters Act clearly places the interests of man as primary. It talks about things that if added to waters could be "detrimental to their use by man or by any animal, fish or plant that is useful to man." Adoption of a similar definition for deleterious substances in the Fisheries Act would help clear the way for adoption of a comprehensive and multiple-use approach to fisheries management.

Some might argue that the adoption of a multiple/integrated-use policy for fisheries planning and management could mark a significant shift in the constitutional setting. Were the benefits from fisheries to be weighed against the benefits of other water uses in a development proposal, fisheries would sometimes come out the loser.

The argument might be that this could not be allowed to happen because of the federal jurisdictional primacy for fisheries.

History demonstrates, however, that the fishery has come out the loser more often that not with the present legislative approach. Were the Fisheries Act amended to provide for the planning and management of fish habitat in conjunction with other water uses, the result would be a more effective voice for fisheries interests and a stronger likelihood of achieving the illusive optimum benefits from this habitat/water resource management.

> IT IS RECOMMENDED that the Fisheries Act be changed to add provisions to Section 31 to allow for the conservation and development of fish habitat through comprehensive management progams in a multiple or integrated water resource context. The provision should be such that the existing prohibitory sections of Section 31 would only be applicable in the absence of the new multiple-use planning approach.

Within any resource management context the suitability of national effluent standards to control the quality of fish habitat or water quality in general has long been debated. National standards result in strictures too weak in some locations, too strong in others. When first proposed, the Minister of the day talked about preventing the development of "pollution havens" in Canada. Perhaps the interest was more one of equalizing waste treatment costs across Canada than of protecting the fisheries. Confronted with a superior jurisdictional power, provinces were willing to accept national standards only if they were to be national minima. Provinces would thus retain the authority to deal with individual local works and undertakings adding requirements more stringent than the national standards if required.

National standards do have their appeal. They readily receive public acceptance since the federal government is generally expected to take a national approach to things. They give the impression of equitable treatment to polluters. They are easy to apply to individual undertakings as opposed to devising site-specific requirements for each waste discharge. They provide industrial planners with at least an indication of what to anticipate from pollution control agencies. They also provide provincial authorities with solid bases on which to add more stringent site-specific requirements as required. Finally, the federal government traditionally adopts national regulations, being loath to allow its employees regulatory discretion.

In spite of these advantages, the superior approach to maintaining fish habitat quality at satisfactory levels would be to base effluent requirements on water quality objectives established for the receiving waters. This would allow incorporating into the effluent quality formula the natural quality of watercourses, their assimilative capacities for certain wastes, the sensitivities of native fish populations, and the impacts of waste discharges already present. The Fisheries Act requires amendment to allow adoption of this approach.

> IT IS RECOMMENDED that the national approach to effluent requirements be changed from one of required standards to one of basic effluent treatment guidelines.
>
> IT IS FURTHER RECOMMENDED that the Fisheries Act be amended to allow for adoption of site-specific industrial and municipal effluent requirements for the protection and conservation of fisheries in a multiple/integrated use water management context.

CANADA SHIPPING ACT (1970-71-72)
PART XX
(Ministry of Transport)

Purpose

To provide for the control of pollution from ships (particularly oil tankers), and the recovery of costs and damages from polluters and a specially created fund.

Provisions

Section 728(1) provides for regulations prohibiting the discharge of specified pollutants from ships.

Section 728(2) requires the master of a ship to report actual and anticipated spills of pollutants.

Section 729(1) authorizes the removal or destruction of ships in distress that are discharging pollutants, or are likely to.

Section 730(1) authorizes regulations prescribing substances as pollutants; defining spill reporting procedures; respecting all aspects of navigation; prescribing the types and amounts of pollutants carried; equipment to contain and clean up spills; retention of oily wastes; and, compulsory navigation routes.

Sections 731 and 732 provide for the appointment of pollution prevention officers and their duties including that of ordering ships to report positions and to assist in a clean-up operation. Authority to seize ships believed to be in violation of Part XX is provided under Section 760(1).

Section 734(1) makes owners of tankers and cargo owners jointly and severally liable for costs of pollutant clean-up and actual losses to Canada, a province or a person.

Section 746(1) specifies that personal losses may include actual and anticipated income losses of fishermen.

Section 735(1) in compliance with international convention defines the limited amounts recoverable from ship and cargo owners where an incident occurs without actual fault on their parts.

Section 736(1) requires ship and cargo owners to provide evidence of financial responsibility for the amounts indicated in S. 735(1) prior to importing or exporting pollutants in bulk.

Section 737(1) establishes a Maritime Pollution Claims Fund to pay unrecoverable clean-up costs, damages and fishermen's income losses.

Section 748(1) provides for contributions to the Fund by regulation up to 15 cents per ton of oil imported or exported by ship.

Section 738 provides for an Administrator of the Fund to review and settle claims against it.

Punitive features of Part XX include fines up to $100,000 for discharging pollutants contrary to regulation or for failing to report an actual or anticipated spill, or for failing to meet other regulations under S.730.

Regulations

A variety of regulations have been issued respecting safety in loading and unloading pollutants, navigation by tankers, maintenance of pollutant containment and clean-up equipment at loeading facilities and on tankers, the safe discharge of oily mixtures and the discharge of water ballast.

Comment

Part XX of the Shipping Act applies to all Canadian waters excepting certain shipping safety control zones in the arctic that are regulated under the Arctic Waters Pollution Prevention Act.

The novel provision of the Maritimes Pollution Claims Fund should be considered for application to other potential pollution sources where the possibility exists that the responsible party cannot be brought before the courts or where there is a risk that the responsible party would be unable to defray pollution clean-up costs and related damages. The concept has already been recommended for adoption with respect to the long term protection of Government and individuals from possible pollution from abandoned mine operations (Mactavish, 1984).

NAVIGABLE WATERS PROTECTION ACT
(Ministry of Transport)

Purpose

To protect the navigability of watercourses.

Provisions

Section 5(1) provides that

> "no work shall be built or placed in, upon, over, under, through or across any navigable waters unless the work and the site and plans thereof have been approved by the Minister ..."

Section 6(1):

> "Where any work ... is built or placed without having been approved ... the Minister may
>
> (a) order the owner of the work to remove or alter the work,
> (b) ... remove and destroy the work ... and
> (c) order any person to refrain from proceeding with the construction of the work ..."

Section 9(3):

> "Where in the opinion of the Minister an existing lawful work has become a danger to or interference with navigation ... any rebuilding, repair or alteration shall be treated in the same manner as a new work."

Section 19:

> "No person shall throw or deposit or cause, suffer or permit to be thrown or deposited

> any sawdust, edgings, slabs, bark or like rubbish of any description whatever that is liable to interfere with navigation ..."

Section 20 prohibits the deposit of

> "any stone, gravel, earth, cinders, ashes or other material or rubbish that is liable to sink to the bottom in any water any part of which is navigable or that flows into any navigable water ..."

Section 23 allows the Minister to designate places where rubble or other materials may be deposited.

Comment

The Act provides strong powers to the federal government to protect the navigability of waters in harmony with its constitutional authority. The terms of the Act were not applied, however, with respect to the building or the Bennett Dam in the late 60's, to the filling of its resevoir or to the operational regulation of its flow, all of which have influenced navigation. Even had the Act been applied, however, it is doubtful if such application could have prevented the ecological consequences in the Peace-Athabasca Delta. Such concerns are beyond the purview of the Act which is the maintenance of navigability.

PRAIRIE FARM REHABILITATION ACT (1935)

(Department of Agriculture)

Purpose

To provide for the rehabilitation of drought and soil drifting areas in Manitoba, Saskatchewan and Alberta.

Provisions

Sections 3 and 4 provide for Governor in Council appointment of Prairie Farm Rehabilitation Committees to advise the Minister (currently, Agriculture) on methods

> "to secure rehabilitation of the drought and soil drifting areas ... and promote ... systems of farm practice, tree culture, water supply, land utilization and land settlement that will afford greater economic security ..."

Sectiom 7 provides for regulations

> "for the effectual execution and working of this Act and the attainment of the intention and objects thereof."

Section 9 authorizes the Minister to

> "undertake the development, construction, promotion, operation and maintenance of any project or scheme ... by virtue of this Act, or enter into agreements with any province, municipality or person with respect thereto."

Section 9(2) requires that all single projects involving more than $15,000 in any fiscal year receive Treasury Board approval.

Comment

The Prairie Farm Rehabilitation Act is quite different from other federal water legislation. Rather than a management or regulatory Act, the PFRA established an agency as a water developer/operator, delivering water to farmers, groups of farmers and farm-based municipalities.

The Act is somewhat of an enigma 50 years after it was enacted. The original drought crisis that spawned it has long since passed and much of the original task has been completed. The Act applies to a small portion of Canada's farm areas. It does not extend to all areas that experience drought conditions.

The range of programs provided by PFRA could be provided by traditional federal agencies, or by provincial agencies perhaps with the cooperation of federal departments of Agriculture, Forestry and Environment. (This is discussed in more detail in Chapter 10.)

The archaic nature of the Act is found in Section 9 that requires each project involving more than $15,000 to be approved by the Treasury Board.

If the concept of the Prairie Farm Rehabilitation Act is to be maintained, the Act and agricultural policy should be changed to allow drought-proofing projects to be delivered to drought-prone farming regions throughout Canada. The Treasury Board approval strictures should also be brought up to date.

ATOMIC ENERGY CONTROL ACT (1953)
(Atomic Energy Control Board)

Purpose

To provide for the control and supervision of the development, application and use of atomic energy ...

Application

The Act relates to radioactive substances and to any other substances, such as heavy water, that the Board may designate as required for the production, use or application of atomic energy.

Provisions

Section 4 establishes the Atomic Energy Control Board to include the President of the National Research Council and four others appointed by the Governor in Council.

Section 9 authorizes the Board, with the approval of the Governor in Council to make regulations:
(a) for developing, controlling, supervising and licensing the production, application and use of atomic energy;
(b) respecting mining and prospecting for prescribed substances; and,
(c) regulating the production, import, export, transportation, refining, possession, ownership, use or sale of prescribed substances and any other things the Board may decide are used for the production or use of atomic energy.

Section 17 declares that all works and undertakings for
(a) the production, use and application of atomic energy;

(b) research and investigation respecting atomic energy; and,

(c) the production, refining or treatment of prescribed substances,

are works for the general advantage of Canada, and are therefore, under federal jurisdiction.

Comment

The AEC Act thrusts another federal agency into the realm of pollution control for uranium mining, heavy water production, and nuclear electric plants. Relationships with Environment Canada and provinces are discussed in Chapter 8.

4. ORGANIZATION

4. ORGANIZATION FOR WATER MANAGEMENT

4.1 Introduction

Water management gained prominence among federal endeavours in natural resources late in 1966 when the Water Resources Branch was moved from Northern Affairs and National Resources to Energy, Mines and Resources where it was combined with the marine sciences and hydrogeological groups. Water management was accorded the status of a departmental sector headed by an assistant deputy minister.

The Second Session of the 28th Parliament (1969-70) was historic for the attention given to water matters. The Canada Water Act, Northern Inland Waters Act, Arctic Waters Pollution Prevention Act and amendments to strengthen the Fisheries Act and the Canada Shipping Act were all enacted.

In 1970, through a Government Reorganization Act, the Department of Environment was established, bringing together much of the Government's expertise on environmental quality management. Fisheries, the water sector of Energy, Mines and Resources, part of the public health engineering group of National Health and Welfare, and the meteorological services of Transport were brought together with other groups including the Canadian Forestry Service and the Canadian Wildlife Service. The prominence of water management began to wane as environmental management began to emerge as a more integrated approach to dealing with problems of water, air and land pollution. An Environmental Protection Service was formed within the new department, assuming the functions of other sectors for the control of pollution. The status of the water management functions dropped a notch in the hierarchy of things to the level of a directorate, reporting with several others to an assistant deputy minister.

The consolidation of agencies with environmental quality mandates weakened in 1977 with the departure of the fisheries and marine sciences services to form the present Department of Fisheries and Oceans. Notably, however, they left behind the administration of Section 33 of the Fisheries Act dealing with water pollution control.

Organizational changes will continue to occur from time to time as the Government identifies new priorities and responds to new challenges. While such changes occur, it is essential not to lose sight of basic objectives and policies that should provide a measure of consistency to the overall thrust of the Government's programs related to water resources. Interdepartmental cooperation will continue to be a vital element of the Government's management system. Emphasis must be placed on strengthening coordination systems and identifying centres of responsibility.

4.2 Current Departmental Roles

Environment Canada has the central managerial-type role among departments involved in water resources management. It is responsible for the Government's policies and programs for both water quantity and quality. It administers the Canada Water Act, International Rivers Improvement Act, Environmental Contaminants Act (with National Health and Welfare), Section 33 of the Fisheries Act (pollution control), the Migratory Birds Convention Act, and the departmental Act that bestows authority for coordination of the Government's environmental programs. Responsibility for meteorology also rests with the Department.

Within Environment Canada, there is a division of responsibilities between two services: the Environmental Conservation Service (ECS) and the Environmental Protection Service (EPS). The ECS, through its Inland Waters Directorate, is responsible for the Canada Water Act and administers all aspects of the Department's roles respecting water quantity and quality except the regulatory aspects of water quality. The EPS carries out that role integrated with air and land pollution control. It is responsible for waste treatment technology development, technology transfer and the formulation of effluent quality regulations, guidelines and codes of good practice. It administers Section 33 of the Fisheries Act, the Environmental Contaminants Act, and advises the Atomic Energy Control Board on environmental protection aspects of the nuclear industry.

Several other departments also play key regulatory roles with respect to specific heads of federal jurisdiction. These include:

(a) Fisheries and Oceans	- fish habitat management
(b) Transport	- navigation and shipping, including pollution control
(c) National Health & Welfare	- human health aspects of drinking water - Environmental Contaminants
(d) Atomic Energy Control Board	- pollution from nuclear facilities

Others have direct operational foles in water management:

(a) Public Works	- operation of certain dams and canals, dredging of shipping channels
(b) Transport	- operation of navigational systems
(c) PFRA	- operation of reservoirs and irrigation systems
(d) Indian Affairs & Northern Development	- water management on Indian Reserves, Yukon and NWT - impacts of federal national policies on territorial water management practices

Another group has important interests in water as developers in support of industries:

(a) Agriculture	- water for farm productivity
(b) PFRA	- water supplies for farms and farm-based communities
(c) Energy, Mines and Resources	- water for energy production
(d) Regional Industrial Expansion	- water supplies for individual industries and community infrastructure

Still others have special interests that do not fit the category of general management, or the specific component of regulation, operation or development:

(a) Northern Affairs	- impact of federal national policies on territorial water management practices
(b) External Affairs	- monitoring and negotiation of international treaties and agreements
(c) IJC (Canada)	- response to Canada-U.S. references under Boundary Waters Treaty
(d) Emergency Planning	- coordination of flood relief and disaster compensation
(e) Science and Technology	- federal research and development policies

While a variety of reorganizational possibilities could be considered, the present situation offers a reasonable situation and provides important separation of the managerial and developmental roles. A management agency should not be placed in the position of judging the merits of its own development proposals.

One could question the separation of the regulatory aspects of water quality management from the monitoring, research, planning and allocation aspects. On the other hand, there are efficiencies in integrating the pollution regulatory functions for air, water and soil. It remains important, however, that the pollution regulator work to achieve the requirements of other agencies rather than attempt to determine its own needs. Agencies such as National Health and Welfare, Fisheries and Oceans, Agriculture, and the Canadian Wildlife Service have the expertise to determine water quality requirements. That expertise must not be duplicated in the control agency. The major requirement is achieving and maintaining close cooperation among all the many agencies involved so that the regulator, the Environmental Protection Service, is conversant with the water quality requirements of water users.

4.3 Interdepartmental Coordination

In 1968, when the Government was considering the Canada Water Bill, it recognized the need for improved interdepartmental cooperation and established the Interim Interdepartmental Committee on Water (ICW). The "interim" label presumed confirmation as a continuing committee following proclamation of the Canada Water Act. Terms of reference for the new ICW were:

> "to consider and approve all federal government water programs until a permanent mechanism was established, and that a committee of ministers should formulate a permanent mechanism for resolving interdepartmental conflicts on water programs; in the light of the proposed Canada Water Act and national water policy."

The committee of ministers were never formed. Conflicts that were not resolved by the ICW itself presumably were worked out on an informal basis among ministers or on a formal basis at meetings of Cabinet committees.

After the Canada Water Act became law, no action was taken to reconfirm the status of the ICW. It continued to perform its coordination and program approval functions through its original terms of reference until, in 1975, the Committee itself adopted revised terms of reference, in the understanding that they fulfilled the intent of the original 1968 Cabinet directive. These were:

> "1. To consider and recommend on all federal water policies and programs in order that all federal efforts are directed towards the same objectives.
>
> "2. To consider and advise the Minister of the Environment in regard to any agreement entered into with the provinces respecting the formulation and implementation of comprehensive basin and water quality management plans.
>
> "3. To consider and advise on other water policy and program matters of interdepartmental significance referred to it by any federal agency.
>
> "4. To conduct such studies as may be necessary to enable the Interdepartmental Committee on Water to advise or make recommendations to the Minister with respect to the formulation, coordination and implementation of water policies and programs in Canada.
>
> "5. To report when necessary to the Interdepartmental Committee on the Environment."

The Interdepartmental Committee on the Environment, established in 1973 to propose ways and means of consolidating and strengthening the coordination process, soon became defunct. The ICW continued to report to the Cabinet through the Minister of the Environment.

It is notable that the revised terms of reference provide for recommendations on all federal water policies and programs rather than approval. The choice of words is not really significant since it is the Cabinet that makes final decisions, not committees of officials.

In its early days, the ICW played a significant role. Major federal initiatives were being developed including the Canada Water Bill, Northern Inland Waters Bill, amendments to the Fisheries Act and the Shipping Act. The first comprehensive river basin planning agreements were being negotiated with provinces. The need for coordination was strong and the ICW played its role.

As time passed and fewer major initiatives were being proposed by departments, the ICW appeared to some to have waned in importance. Its continuing significance is attested to, however, by the apparent wish in some quarters that it would simply fade away. There have been attempts to "end run" the Committee and seek Cabinet approval of programs without ICW recommendation. In the last few years, for example, PFRA has attempted to have irrigation programs approved without interdepartmental review. Fisheries and Oceans was reluctant to have their habitat policy proposal reviewed by the ICW.

It is essential that an effective means exist to coordinate and integrate federal water programs, particularly in the current climate of financial restraint in combination with the growing complexity of water issues -- water shortages in the west and water pollution from non-point sources. The interests of the agricultural water developer, energy proponent, fish habitat manager and industrial stimulator must be drawn together in a forum to foster mutual understanding and cooperation within a consistent federal water policy framework.

> IT IS RECOMMENDED that the federal government formally reconfirm the existence of the ICW with the 1975 terms of reference, but excluding references to the defunct Interdepartmental Committee on the Environment.

To ensure the effectiveness of the Committee, both the Privy Council Office and the Treasury Board should be admonished not to consider water program initiatives of departments without the advice of the ICW or the Minister of the Environment.

If the ICW is to review and recommend on federal water initiatives, however, it is encumbent on the Government to draw up a considerably more explicit and detailed water policy than it now has. The last policy statement published was in 1978.[1] For the most part, its 16 components are but general statements of principle. For example:

> "The federal government is committed to the conservation, development and use of Canadian water resources for the greatest social and economic benefit of Canadians, including both present and future generations."

Such statements are fine as far as they go, but they do not go far enough. Indeed, there are indications that they are primarily a collection of broad statements to support existing programs, rather than a comprehensive exposition of policy. For example, policy no. 3 states that:

> "The federal government is committed to the restoration and protection of water quality and the enhancement of aquatic

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[1] Environment Canada, 1978. A vital resource: federal policy statement on inland waters.

> ecosystems through the development of water quality objectives to protect water uses, the application of national effluent regulations and guidelines to control pollution discharges at source; and the control of nutrients and chemical substances which can become dispersed in the environment."

The "development of water quality objectives" suggests the use of site-specific requirements for the treatment of industrial and municipal wastes. The "application of national effluent regulations and guidelines" as a principle pollution control strategy does not lead to the attainment or maintenance of ambient water quality objectives. There are two different approaches here, one supported by the concepts of the Canada Water Act, and the other by the concepts of the Fisheries Act. They can be made compatible if articulated in more detail and supported by other measures; but the federal water policy statement does not provide that measure of articulation and integration.

What is required is a set of working policies integrated into a comprehensive package. A working policy should contain three components: an objective; a strategy for achieving the objectives; and, the timeframe of priority assigned to reaching the objective. These exist for individual federal programs, but they remain to be integrated.

The development of an action-oriented federal water policy should take place in an interdepartmental forum to ensure an end result that all agencies contribute to and can support.

> IT IS RECOMMENDED that the ICW be charged with developing and proposing a set of water management objectives, strategies and priorities that integrate the interests of the water manager, water developer, and water user departments.

4.4 Federal-Provincial Cooperation

There are a variety of forums to effect federal-provincial cooperation. The Canadian Council of Resource and Environment Ministers (CCREM) provides what might be described as a neutral forum at the national level. It is a consultative body of ministers from the provincial and the federal governments. Territorial Government ministers usually attend as well. As a non-voting forum, it has proven itself useful in developing common approaches to some difficult issues. Currently the CCREM has a task force of officials working to collate water quality objectives used in Canada in an effort to produce common objectives for use across the country.

The Federal-Provincial Advisory Committee on Environmental and Occupational Health advises ministers of Health on water quality issues, including drinking water requirements. Under the Canada Water Act, at the bilateral level, a variety of options are available, ranging from formal meetings of ministers to informal meetings of provincial and federal regional staff. At the more formal level, Consultative Committees on Water were established in the '70's to provide for review of water management issues by senior officials of each province and Environment Canada. Used fairly frequently a decade ago, few Consultative Committees continue to meet, apparently because neither side has felt the need to initiate meetings at this level.

Briefs submitted to the Inquiry from some provinces suggest an interest in renewing such senior level discussions. It is essential that senior provincial officials have access to senior staff in Ottawa, for it is there that federal policies are made. To remove any uncertainty about its willing to consult:

> IT IS RECOMMENDED that the deputy minister of Environment Canada write to his counterpart in each province expressing interest in revitalizing the Consultative Committees on Water.

An interesting initial subject for discussion at such meetings would be the forthcoming report of the Inquiry on Federal Water Policy.

Other bilateral forums exist under federal-provincial Accords for the Protection and Enhancement of the Environment. These Accords, signed with eight of the ten provinces at the ministerial level in 1975, provided for cooperative efforts in environmental quality management and bilateral committees to oversee the implementation of the Accords and to consult on environmental matters. The Accords are commented on in more detail in Chapter 8.

At the specific program level, each new federal-provincial agreement provides for some sort of bilteral arrangement to manage the program. Perhaps the issue here is not the availability of coordinating forums, but the fact that different cost-sharing arrangements are available depending on the federal department involved. Under the Canada Water Act, various planning and flood control agreements normally provide for 50-50 cost-sharing. Water quantity and quality monitoring agreements have sharing formulas determined by the relative federal and provincial interests in the data from each station. On the other hand, federal-provincial water development agreements offered by Regional Industrial Expandion or PFRA may provide for a significantly greater proportion of federal monies. This can cause difficulties for interdepartmental coordination of programs, with provinces playing one off against the other, seeking the sweetest deal.

An important distinction to be maintained with respect to cost-sharing is one between water management and water development programs. All federal water planning programs that provide for cost-sharing should employ the same formula. Different ratios that may apply to water development projects should be justified on grounds other than water management policy. Provinces should be kept fully informed of the logic behind the various cost-sharing formulas adopted by federal agencies.

Perhaps the most important aspect of federal-provincial consultations from the provincial point of view is timing. Too often the consultation turns out to be an explanation of new federal policies or programs after decisions have been made in Ottawa. Provinces need to be more closely involved in the development of federal water policies that influence provincial water management. In spite of protests about confidentiality, it should be possible to discuss concepts under consideration for new federal legislation or programs without violating the rules of Cabinet secrecy.

5. WATER MANAGEMENT DATA - QUANTITY

5. WATER MANAGEMENT DATA - QUANTITY

5.1 The Policy

In January 1975, the federal government issued an Order-in-Council committing itself to a national water quantity survey with specific guidelines for determining the government's interests in each gauging station. Stations are to be designated as of federal interest, federal-provincial or provincial. This classification determines the role of the federal government in constructing, operating and paying the costs of gauging stations. (The situation is different in Quebec where the province operates most of the network and the federal government pays the Province in accord with its interests in each station.)

The objective of the Water Quantity Management Data program of Environment Canada is:

> "to collect, process, analyze, store, interpret and provide complete and meaningful hydrometric (streamflow, water level, sediment, etc.) data on Canadian waters in cooperation with the provinces to aid in the conservation, development and use of Canadian water resources for the greatest social and economic benefit of Canadians, including both present and future generations."

The Survey network gathers data on streamflow, water levels, and to a limited degree, sediment transport. The data are used by a variety of federal, provincial and industrial clients for flood flow forecasting and reservoir regulations planning and operation of hydro-electric facilities, irrigation, navigation, industrial and municipal works, as a basis for determining apportionment between provinces and among licensees, and to meet various requirements of international obligations and federal-provincial agreements.

6. WATER MANAGEMENT DATA - QUALITY

The government pays the full costs of "federal" stations and one half the cost of "federal-provincial" stations. The provinces pay the costs of "provincial" stations.

"Federal" stations include:

(a) those that are required under statutory obligations or support programs of various federal agencies which include specific federal works, studies or investigations, research projects, navigational requirements and management responsibilities;

(b) those that monitor waters flowing across or which form part of provincial or territorial boundaries and where federal responsibility has been established by agreement or is justified by an inter-jurisdictional concern;

(c) those on streams crossing or forming part of the international boundary for which there are federal responsibilities arising from treaties, agreements, studies or ITC orders; and,

(d) those required to define a national inventory of surface waters including information on trends in major drainage basins, total surface water resources and significant discharge to the oceans.

"Federal-provincial" stations include:

(a) those where both governments have stated an interest in the need for the information;

(b) those where joint responsibility is established under federal-provincial agreement; and,

(c) those that provide an assessment of the quantity of water available in distinct hydrologic zones within a province.

"Provincial" stations are those whose data are required in support of specific provincial projects, including municipal and non-governmental interests.

5.2 The Program

As of April 1982, the network included 3,074 stations, an increase of 235 since the program was formalized by federal-provincial agreements in 1975. Of this total, 1,182 were classified as federal stations, 871 were federal-provincial and 1,021 were of provincial interest only. Data from an additional 321 stations contributed by other agencies, located primarily in Québec, Ontario and Alberta, brought the total network to 3,395 reporting stations. Sediment data were obtained from only 104 stations of the network.[1]

Total program costs in 1982-83 were $18,870,700 to which the provinces contributed $4,634,200, leaving a net federal cost of $14,236,500. Canada paid an additional $665,400 to Québec for data obtained from its network bringing the total federal cost to $14,901,900.

A total of some 356 person-years of employment were used for the water survey in 1982-83, a slight decrease since 1975 even though the network had grown by 8% during the period.

5.3 Previous Evaluations

An independent evaluation of the program made in 1977 by Acres Consulting Services Ltd., indicated a benefit/cost ratio of eight to one (8:1).

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[1] Environment Canada, 1984. Water quantity surveys federal-provincial cost-sharing agreements. Annual Report 1982-83.

An internal evaluation was completed in 1980.[1] The study identified a number of deficiencies, most of which have been addressed and largely overcome. Among the more important issues and responses were the following:

(a) The governments' restraint program had reduced the ability to respond to requests from provinces for the addition of new stations to the network as provided for under terms of formal federal-provincial agreements. The issue was not so much one of funding since half or all funds were to be contributed by the provinces making the requests. The problem was that of obtaining manpower to operate the stations. Person-years dedicated to the water quantity program has decreased from 363 to 346 between 1975-76 and 1980-81 while the number of gauging stations had increased by 7%. Manpower had been stretched to the extent that new stations could only be added with further reduction in ability to analyze data, evaluate and plan the network. The situation has been partly rectified by the addition of some 26 person-years to the program.

(b) The Water Survey of Canada had been slow in employing new technologies for collecting and processing data from remote locations. Approval was received in 1982-83 for the addition of 350 data collection platforms over a five-year period. These stations transmit data through satellites to a receiving station in the United States and thence by ground lines.

The program still requires improvement to reduce costs and the loss of data through ground line transmission from the receiving station. This could be overcome with the establishment of three Canadian receiving stations. The Department is preparing proposals to establish such stations for the joint use of water survey and meteorological stations.

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[1] Environment Canada, 1980. An evaluation of the hydrometric surveys component EMS water management data program, No. 51. Project Ref. No. DOE/EMS.4.79/80.

(c) The Department was criticized for not assuming a more assertive role in analyzing and interpreting data, confining itself to collection, processing and archiving functions. In response, mini-computers have been obtained for headquarters and regional offices to allow for some preliminary data analysis, interpretation and network evaluation.

5.4 Outstanding Issues

5.4.1 Level and Type of Data Services

Clients are constantly seeking data on a faster near-real-time basis. Use of satellites for transmission of data from automated data collection platforms only whets the appetite of the users for flood forecasting, reservoir regulation, irrigation operations, navigation controls, and so forth. To meet the demand, the Water Survey of Canada will have to develop a more comprehensive publication and distribution system for hydrological information.

At the same time, demands are growing for information on parameters in addition to streamflow, levels and sediments. Data on water quality, temperature, hydraulics of flow, as well as snow and ice are becoming increasingly important as inputs to water resource management models. More comprehensive data on ice conditions is sought for predicting spring break-up and the formation of ice jams. Atmospheric data on rainfall, termperature and humidities is also sought from remote locations.

> IT IS RECOMMENDED that the Water Survey of Canada, in cooperation with the Atmospheric Environment, continue to pursue a comprehensive network of automated data collection platforms in inaccessible areas of Canada together with the development of a satellite/computer based data communication and distribution system and with the establishment of satellite data receiving stations in Canada. To meet demands, new parameters, particularly water temperature, should be added at selected stations.

Providing data on a near-real-time basis and on a larger number of factors will increase costs. At the present time, Water Survey data are supplied on request at no charge. This is not consistent with meteorological data available from the Atmospheric Environment Service of the same department where service charges sometimes apply. Environment Canada's services should adopt common recovery policies to help defray rising costs and to help ensure that demands for data are in response to real needs.

> IT IS RECOMMENDED that Environment Canada review the data distribution systems of its various services with the intention of applying a cost-recovery policy for data supplied to clients who are not party to federal-provincial data gathering agreements.

5.4.2 Analytical and Interpretive Tools

The advent of sophisticated computer models and analysis techniques offer important opportunities for water managers. Opportunities for improved accuracy and efficiency lie in the intensive analysis of existing data to achieve optimum network design, to apply data from monitored watersheds to those that are not, and to improve operational procedures.

While it is now possible to identify redundancies in existing networks, the ability to predetermine the best mix and location of stations is just emerging.

> IT IS RECOMMENDED that the Inland Waters Directorate receive increased resources to strengthen the statistical analysis and modelling capability of its new Hydrology Division.with a five-year objective of a net increase in network efficiency.

5.4.3 Sediment Survey

The Department has only a very small complement of 11 person-years employed on sediment survey and analysis. Basic data are now collected from over 100 sites but too little expertise is available for analyzing and interpreting data, or planning an effective network. The majority of sampling stations for routine sediment data have been established for specific project needs of clients. Fluvial morphological surveys to assess the dynamics of rivers, lakes and reservoirs as a result of erosion and sedimentation have been carried out on an ad hoc basis at the request of other agencies such as the Prairie Provinces Water Board.

Other federal and provincial agencies conduct sediment studies related to their particular interests such as determining the impacts of man's activities on fish habitat, tracing pathways of toxic substances, estimating the potential impact of sediment on proposed reservoirs, and determining dredging requirements for shipping channels. There appear to be opportunities for increasing the effectiveness of these various sediment related programs through improved coordination. For example, a well designed sediment survey by the Water Survey of Canada could respond to the needs of those interested in tracing the movements of toxic substances.

Morphological studies of rivers used for commercial shipping could identify ways to change sedimentation patterns and the need for expensive dredging. There seems to be a missing catalyst, however, in that there is no particular centre of stream morphology expertise within the federal government.

> IT IS RECOMMENDED that Environment Canada employ the Interdepartmental Committee on Water to undertake a comprehensive review of sediment related issues of interest to federal agencies and examine the potential for improving the effectiveness and efficiency of programs through mutual support or integration into a centre of excellence.

5.4.4 Snow and Ice Monitoring

In 1980, a basic glacier volume-change monitoring program in Alberta and British Columbia was discontinued to allow reallocation of resources to programs of higher priority. Yet the advance or retreat of glaciers is reportedly sensitive to very small changes in average temperatures and monitoring such changes could provide early warnings of climatic changes associated with atmospheric carbon dioxide build-up.

The Inland Waters Directorate has also found it necessary to reduce its involvement in monitoring the water equivalent of winter snow accumulations, restricting itself to those areas where federal-provincial flood forecasting agreements are in place.

Recent advances in satellite imagery, its interpretation, and automatic data telemetry systems offer intriguing prospects to study glacier dynamics and the water content of snow accumulation with the expenditure of little manpower.

Since both glacial ice and snow accumulated over the winter period are essentially reservoirs of water, data on their condition is extremely valuable to water resource managers in virtually all areas of water use.

> IT IS RECOMMENDED that the Inland Waters Directorate be given the responsibility to develop remote sensing procedures and automatic data acquisition instrumentation with the aim of applying the results of glacier volume-change and snow condition monitoring programs to meet the requirements of water resource managers.

5.4.5 Information Services

Users of water resources and related data often are unaware of all the series of information that are available, where they may be obtained and at what cost.

> IT IS RECOMMENDED that Environment Canada provide a coordinated information service and publish a directory of water related data and sources thereof.

5.5 Challenges for the Future

According to recent observations, Canada may be moving from a sustained period of fairly predictable seasonal climatic conditions to a period of more dramatic swings in weather systems. At the same time, speculation is growing that major change in climate may be expected over the next few decades as a consequence of increasing concentrations of atmospheric carbon dioxide and the "greenhouse" effect it may initiate.

These changes may be expected to cause an increase in the number of severe flood events on the one hand an the occurrence of more frequent and extended periods of drought on the other. Demands for flood hazard reduction measures like forecasting services and storage reservoirs may be expected to increase. Requirements for irrigation will also rise. These increasing pressures will be in addition to the usual growing demands for water for hydroelectric facilities, industrial and municipal services.

Demands may well increase in some basins to the extent that they will surpass supplies and lead to a growing number of interbasin transfers.

Wise response to the anticipated pressures on water supplies can only evolve from a sound knowledge base of availability gathered over an extended period of time to ensure an understanding of the extremes that may occur.

Thirty years of continuous records are often required to yield adequate data for planning purposes; but even that may not be enough. For example, there has been no flooding in the Calgary area on the Bow River in the last 52 years, but there were seven significant floods there in the preceding 35 years.

As Canada's population and economic development continue to grow, possibly confronted with greater variability of weather systems combined with a gradual overall change in climatic conditions, the needs for knowledge of water supplies can only be expected to increase. The Water Survey of Canada fills a significant portion of the need, but improvements will be required as water management becomes more intensive in response to increasing demands and diminishing "surpluses" with which to meet them. Some of the improvements needed have been outlined above.

The Water Survey of Canada fits the jurisdictional setting of mixed responsibilities for water management and provides the important elements of standardization of sampling methods, minimized duplication of sampling by different agencies, and a common data storage and distribution system. These factors all contribute to cost effectiveness, and the federal-provincial cost-sharing arrangements reasonably reflect user values for the data.

It is essential to maintain a single national agency for basic water resource data collection, storage and dissemination. The single agency concept ensures the integrity of data, enables the maximization of useful information contained in the data, and inhibits duplication of effort.

6. WATER MANAGEMENT DATA - QUALITY

6.1 Introduction

The Water Quality Branch of Environment Canada provides ambient water quality data and interpretive information on international, interprovincial and other waters of significant national interest. It operates a monitoring program through its regional offices by collecting samples from some 670 stations across Canada, analyzing these samples in the national laboratory and entering the data in the computerized National Water Quality Data Bank (NAQUADAT). These data are used to define the health of Canada's water resources, delineate areas of pollution, detect emerging pollution problems, identify transboundary movement of pollutants, provide baseline water quality data for environmental assessments of proposed developments, formulate regulations, develop water quality criteria and objectives, develop water pollution abatement programs and evaluate the effectiveness of such abatement programs, and meet the federal government's obligations under applicable legislation, federal-provincial and international agreements and treaties.

Surface waters represent the major class of samples analyzed in these laboratories but other aquatic substrates such as precipitation, sediment and aquatic organisms are also analyzed. Approximately 50,000 samples are analyzed annually.

In addition to monitoring water quality and making this information available, the Water Quality Branch recommends water quality objectives for Canada. A water quality objective is expressed either as a concentration of a constituent or as a description of the body of water.

The initial water quality monitoring program of the federal government, starting in the 1930's, was industry-oriented, measuring natural chemistry parameters and specific conductance, suspended solids and turbidity. The International Hydrological Decade (1964-74) led many countries to monitor water quality as part of a global undertaking. Canada set up a national monitoring network of approximately 1,000 stations with regional analysis laboratories in Calgary, Moncton and Ottawa. Part of this network was established in direct response to International Joint Commission studies of the Great Lakes, St. Lawrence, St. Croix, Red and Rainy Rivers as well as the Garrison Diversion Project. Other components were installed as part of federal-provincial river basin planning exercises.

Following the A-Base review of Environment Canada in the mid-1970's, the definition of significant national concern seemed to change. The national water quality network was required to beat a hasty retreat to the borders, primarily the Canada-U.S. border, where Canada has both explicit jurisdiction and commitments to the IJC. Other stations were retained on interprovincial waters where Canada had made monitoring commitments, such as to the Prairie Provinces Water Board.

In 1982, the government reappraised its role in light of significant water quality problems that where showing up. It agreed to the establishment of a new national water quality network based on federal-provincial cost-sharing agreements. Forty new person-years and an annual budget of $2 million were allocated, with some cost recovery from provinces entering agreements. Areas of significant national concern included monitoring for the impacts of acid rain and toxic substances.

6.2 The National Water Quality Assessment Policy

The objectives of the new water quality assessment program are to:

(1) provide sceintific and technical information and advice to governments, private agencies and the public; and,
(2) detect emerging water quality problems and to evaluate issues from regional and national points of view.

More specifically, water quality monitoring objectives are to:

(a) determine changes and long-term trends in water quality;
(b) detect emerging quality problems;
(c) determine the effectiveness of regulatory measures; and,
(d) assess the need for special investigations.

The strategy adopted is to negotiate federal-provincial monitoring and cost-sharing agreements. Networks are to be based on river basin requirements. Cost-sharing arrangements, similar to those of the Water Survey of Canada, are to be determined on the basis of federal and provincial interest in each station. Federal interests relate to international and interprovincial waters, the North, federal lands, and the pervasive problems of toxic chemicals, long-range transport of air pollutants, and nutrient controls.

Issues of priority concern addressed by the national water quality assessment program include the ambient quality of the Great Lakes and other international waters across the country. Along with routine assessment programs on behalf of the government, special studies are carried out to advise the International Joint Commission. The identification of toxic substances and determination of their concentrations, through sophisticated laboratory techniques, has become a major preoccupation of the program.

On interprovincial, provincial-territorial, and provincial waters priority issues include determination of the effects of industrial and agricultural development and the insidious impacts of acid rain.

To ensure consistency and comparability of results, all provincial laboratories that may be employed in the program will be coordinated with Environment Canada's quality controls.

6.3 The New National Monitoring Program

The new national water quality assessment program, to be developed through federal-provincial agreements, will yield a national monitoring network integrating the needs of federal and provincial governments, and providing a National Water Quality Bank (NAQUADAT) containing comparable data obtained through sophisticated and standardized analytical techniques.

The only federal-provincial agreement in place to date is with Quebec. Negotiations are well advanced, however, with Newfoundland, Alberta and British Columbia.

The determination of cost-sharing arrangements for individual stations is based on the interests of the two governments and on negotiation. In Québec, for example, the "federal" stations include networks on transboundary waters, along the St. Lawrence, in Nouveau Québec, and an acid rain network covering some 30 lakes. The majority of "federal-provincial" and "provincial" stations are on tributaries to the St. Lawrence. The "federal-provincial" stations include a 48 station toxic chemicals network. In total, there are 478 stations, 27.4% of which have been designated as "federal", 37.0% as "federal-provincial", and 35.6% as "provincial". The Province operates the majority of the network.

Vital to the success of water quality monitoring are sophisticated laboratory facilities with strict quality control of analysis procedures. Environment Canada operates a national laboratory at Burlington, Ontario and regional ones at Moncton, Longueil, Saskatoon and Vancouver. These facilities conduct analyses for time-sensitive parameters such as dissolved oxygen, pH and conductivity. The National Water Quality Laboratory at the Canada Centre for Inland Waters, Burlington, is being expanded to handle the complex and expensive analyses for toxic chemicals and dissolved metals on a national basis. Where provincial laboratories are to be used, the agreements will provide for quality control by Environment Canada.

6.4 Program Administration

Federal interests in network and sub-network design are determined through consultation among the services within Environment Canada and with other interested agencies such as Fisheries and Oceans.

New resource allocation to the federal-provincial water quality network began in 1983-84 with 6 person-years and $471,000. As the program develops to a full national network, a total of 40 person-years and an annual outlay of $2.05 million is expected to be required, of which about 68% would be recovered from participating governments. The network should be complete by 1986-87.

6.5 Comment

The adoption of the federal-provincial cost-sharing agreement approach for the water quality monitoring program is another example of cooperative arrangements that enhance coordination, improve data compatibility and promote efficient use of available resources.

The objectives of the monitoring program can only be met by maintaining the network on a long-term continuing basis. This requires long-term commitment of funds, something governments prefer to avoid so that resources may be reallocated in response to changing priorities. Acceptance of the formal agreement process will help to ensure a continuing commitment of resources, but does not guarantee it. To maintain support, it is essential that as experience with the network develops, it be refined through analyses of station location, parameters monitored, sampling frequency and sampling methods. The possible advantages of combining some water quality sampling needs with the water quantity monitoring network need to be explored in greater depth than seems to have been the case to date. Suspended sediment quality analysis may become more meaningful if coordinated with the monitoring of river morphology augmented by sediment core analyses for contaminants. Several quality factors such as pH and conductivity may be amenable to automatic sensing and data transmission from the Water Survey of Canada's expanding network of data collection platforms.

> IT IS RECOMMENDED that the design of national networks for water quality and water quantity monitoring be thoroughly examined for opportunities of mutual support and cost economies.

In spite of the fact that the federal government has full responsibility for water management in Yukon and the Northwest Territories, the water quality monitoring network has yet to be expanded into those regions. The Department of Indian Affairs and Northern Development does, however, maintain a water quality surveillance program of industrial and municipal facilities. While not of highest priority, at least a skeletal component of the network is needed to follow up on early indications of acid rain and other airborne pollutants, to monitor for potential influences of tar sands operations in Alberta, as well as to maintain long-term surveillance of streams below abandoned mine sites.

The national water quality monitoring network is, or will become, a vital intelligence component in Canada's water and environmental quality management systems. Its data, in combination with that from the Water Survey of Canada, will provide the basis for intelligent water development and regulatory planning.

The final comment of the previous chapter applies to the national water quality monitoring network as well. The combining of federal, provincial and industrial interests in a cost-shared and work-shared program is the most efficient approach in the Canadian context.

> IT IS RECOMMENDED that the federal government maintain a long-term commitment to the national water quality assessment program.

7. PLANNING

7. PLANNING

7.1 Introduction

The concept of water resources planning, comprehensive planning in particular, was introduced as a federal policy in the Canada Water Act (1970). Prior to that time, federal involvement with the provinces had been limited to the involvement in engineering, benefit-cost analysis and financial contributions to flood control projects under the Canada Water Conservation Assistance Act (1953). The multi-purpose planning and management concept gained popularity with the growing awareness that pollution from industrial and municipal sources was disrupting or making other uses more expensive in eastern Canada, that Canada was experiencing a period of rapid growth with new and competing demands on water resources, and that actual or perceived shortages in western Canada and the United States posed critical problems of conservation and apportionment to sustain economic and social development.

The river basin planning program implemented under the Canada Water Act has been described in detail by Brulé, Quinn, Weibe and Mitchell (1981). Its main features are outlined here to provide the background for comment and recommendation, and one specific planning strategy, the flood damage reduction program, is described in some detail in Chapter 9.

7.2 Objective

The basic objective of Environment Canada's water planning policy is embodied in the preamble of the Canada Water Act:

> "...the Parliament of Canada is desirous ... that comprehensive programs be undertaken ... in cooperation with the provincial governments ... in relation to water resources for research and planning ... and for their conservation, development and utilization to ensure their optimum use for the benefit of all Canadians."

7.3 Strategy

Section 4 of the Act provides authority to the responsible Minister to enter into agreements with provinces "to formulate comprehensive water resource management plans" where there is a "significant national interest".

The operational strategy involves federal-provincial consultations that lead to the identification of candidate river basins for joint comprehensive planning, or single-issue planning respecting problems of federal and provincial concern. Formal agreements define the nature of planning studies and provide for 50:50 cost-sharing.

Cooperation of federal and provincial agencies most initmately concerned with water management is achieved through appointment of their representatives to the supervisory board established to management the program and the apportionment of some of the funding to them to provide for studies of special interest to these agencies.

Canada Water Act planning agreements are restricted almost entirely to interjurisdictional river basins, to rivers important to salmon, or to river systems in the territories -- that is, water courses where the federal government has some jurisdiction over water. There have been minor exceptions, but the guiding rule seems to be one of concentrating on waters with federal responsibilities.

7.4 The Program

Initially, the federal government was a strong proponent of comprehensive multi-purpose planning exercises. Studies of the Qu'Appelle, Okanagan, Souris, Saint John and Shubenacadie-Stewiacke basins are examples. It became evident at an early date, however, that most provinces preferred concentrating planning activities on specific issues, or opted to concentrate on detailed planning at the local level. The federal policy has been flexible enough to respond to the single issue approach, the most outstanding initiative being its flood hazard reduction program introduced in 1975. (This program is discussed in some detail in Chapter 9.) Detailed planning at the local level, as exemplified by some of the programs of Ontario's Conservation Authorities, has usually been perceived as outside federal jurisdiction by both the provinces and the federal government.

In addition to multiple purpose planning, several agreements have been restricted to water quality aspects. These have included Lake Winnipeg, the Ottawa River and the St. Lawrence River. Several studies have concentrated on flow regulation. Studies of the Ottawa River and Montreal region pertained to flow regulation for flood control, hydroelectric power generation, navigation, recreation and water quality needs.

Ecological problems were the centrepiece of studies of the Peace-Athabasca Delta. The studies were designed to find ways to mitigate the impact of a new hydroelectric dam upstream. Ecological studies of north shore tributaries of the St. Lawrence were conducted to facilitate impact assessments of future major development proposals.

Two joint studies have been directed at issues of individual cities. A study of the Waterford River flowing through St. John's, Newfoundland, was designed to examine the impact of urbanization on the watercourse and to prepare development criteria to protect it. In the Charlottetown area, a study of the local ground water aquifer potential to supply the city has been completed.

Implementation of planning study recommendations has occurred in several ways. In some cases, there has been formal implementation as was the case for the Qu'Appelle River. In this instance, the funding arrangements of several agencies were coordinated by the Department of Regional Economic Expansion. The implementation agreement for the Okanagan included CMHC loan funds for municipal sewage treatment and Canada Water Act contributions for improvements to flood control works. In some cases, no formal implementation agreements were signed, but arrangements were made to involve the funding programs of appropriate federal departments. This was the case with the Souris River Basin study.

In other instances, the majority of recommendations were more appropriate to entirely provincial implementation. This was apparently the situation with the Shubenacadie-Stewiacke Basin study and the water quality study of the St. Lawrence.

7.5 Comment

The shifting emphasis away from comprehensive river basin planning is indicated in Table 7.1. Of the Inland Waters Directorate's total resources of $100,290,000 and 1,033 person-years of employment, less than 1% was used for river basin planning. These figures exclude the flood damage reduction program, which has become Environment Canada's major planning program. In 1983-84, for example, $9,323,000 and 31.5 person-years were dedicated to the flood damage reduction program.

Table 7.1

CANADA WATER ACT RIVER BASIN PLANNING
ENVIRONMENT CANADA EXPENDITURES

YEAR	$000	PERSON-YEARS
1979-80	1,812	32.0
1980-81	1,835	21.9
1981-82	1,374	21.8
1982-83	939	9.2
1983-84	1,062	8.8

The Inland Waters Directorate has been very conservative in its judgments as to what constitutes "significant national concern", the principal criterion on which federal participation in water resources planning programs is decided. With few exemptions, it has confined its involvement to situations where the federal government has a clear jurisdictional role respecting water. This is unfortunate. There are other federal roles in the national interest that require careful water planning and management. Regional economic development is one. Protecting public health is another.

While it is quite appropriate for a department with a resource management-type function not to become involved in water development projects that may receive federal support in the regional development context, it is appropriate to be involved in planning for the optimum use of water for regional development. The purpose of the Canada Water Act provides for this role as does Environment Canada's definition of "significant national interest".

Why then has the Inland Waters Directorate not offered to assist Prince Edward Island in assessing the potential of its ground water aquifers to support economic development? Why has no program been offered to monitor the quality of the Island's ground water, already known to be contaminated in some locations by agricultural pesticides? The Prince Edward Island economy is virtually dependent on ground water. It is obviously in the national interest to determine the extent and capacities of the aquifers, their quality, and their susceptibility to pollution by salt water intrusion from below or pesticides from above.

Prince Edward Island's ground water is but one example of an area where there would be "significant national concern" albeit no federal jurisdiction with respect to the water itself. Other regions of Canada are similarly dependent on ground water, yet the Inland Waters Directorate has been reluctant to get involved, unless an aquifer happens to straddle a provincial boundary. This is a mistake, failing to fulfill a responsibility in an aspect of water management of "significant national interest".

> IT IS RECOMMENDED that the Inland Waters Directorate, Environment Canada, reassess its role respoecting water management for regional economic development, particularly in those regions dependent on ground water.-

IT IS FURTHER RECOMMENDED that the [illegible]land Waters Directorate develop closer ties with the Department of Regional Industrial Expansion so that it may help identify and respond to water research, monitoring and planning needs in support of regional development policies and programs.

8. REGULATION

8. REGULATION

8.1 Introduction

The federal government plays advisory, operational, legislative and advocative roles respecting the regulation of water levels and flows, navigation, shipping, pollution and fish habitat. This brief chapter concentrates on the last two because they sometimes lead to federal-provincial and interdepartmental frictions. Some of the other regulatory roles must at least be mentioned, however, because of their considerable importance. They tend to be taken for granted because they operate smoothly, even though some of them stem from what were difficult interprovincial or international problems. A few examples of the federal roles in regulating water quantity are outlined in the following section.

8.2 Regulating Water Quantity

8.2.1 Federal-Provincial Arrangements

Environment Canada and PFRA sit on the Prairie Provinces Water Board. Environment Canada chairs the Board, provides 50% of its budget ($352,000 in 1983-84), and undertakes the streamflow and quality monitoring required by the Board in implementing the apportionment agreements. The Board undertakes specific investigations related to the apportionment agreement, and some of these are conducted by Environment Canada. Examples include a study of return flows from major irrigation systems and reservoir evaporation estimation models.

In 1983, Canada, Ontario and Quebec entered an Agreement Respecting Ottawa River Basin Regulations. Under this agreement, the Ottawa River is regulated, taking account of the interests of hydro-power production, flood protection, navigation, low water problems, recreation and water quality factors. Canada, through Environment Canada, provides a small secretariat, contributes to technical studies required and supplies 50% of the funding required.

Since 1919, Canada and Ontario have participated in the Lake of the Woods Control Board. Manitoba became a full partner in 1958. Established under the Lake of the Woods Control Board Act, the Board regulates the outflows of Lake of the Woods and Lac Seul to achieve conditions satisfactory to the various interests. A permanent engineering group/secretariat is maintained by the Inland Waters Directorate of Environment Canada. Canada pays one-third of the costs based on its interest in navigation, while the two provinces share the remainder in proportion to the developed hydroelectric power developed in each.

8.2.2 International Arrangements

For international waters, federal managers represent Canada on 12 Boards of Control reporting to the IJC on the supervision of Canada-U.S. agreements respecting the levels and flows of lakes and rivers. Environment Canada, Fisheries and Oceans, and Transport supply the required water monitoring data. The Boards of Control regulate the St. Lawrence, Niagara, St. Croix, Rainy River, Lake of the Woods, Souris, St. Mary-Milk, Osoyoos, and Columbia Rivers, and Lakes Superior, Kootenay and Champlain.

The IJC has also appointed a number of investigative-engineering boards to assist in responding to Canada-U.S. references respecting the regulation of boundary water flows and levels. Experts from Environment Canada serve on these Boards and perform investigative studies required. There are investigative-engineering boards examining quantitive and qualitative issues on the Souris and Red Rivers, Garrison Diversion, Lake Erie Regulation, Great Lakes Diversion and Consumption, Poplar River Quality and a Great Lakes Levels Advisory Board.

Several Canada-U.S. water regulation agreements are the substance of special treaties and do not fall under the aegis of the IJC. These include the Columbia River Treaty Permanent Engineering Board, Lake Memphremagog Board, and the Niagara Treaty Board. Again, Board membership and technical data are supplies by federal agencies, primarily Environment Canada.

Unfortunately, no separate estimates of financial and personnel resources committed to these international regulatory bodies are available, but they obviously amount to a substantial base load, particularly for the Inland Waters Directorate of Environment Canada. Their significance must not be forgotten when personnel and financial quotas are set each year.

8.3 Regulating Water Quality

8.3.1 Introduction

The federal government provides for the protection of water quality through both direct and indirect means. Indirect approaches include, among others, provisions of the Clean Air Act, Transportation of Dangerous Goods Act, Pest Control Products Act, and the Environmental Contaminants Act. Only the last two have been dealt with in this review.

The major shortcomings of the Environmental Contaminants Act are addressed in Chapters 2 and 13. Both Environment Canada and National Health and Welfare are aware of its deficiencies including the painfully slow implementation procedures that the Act requires. The urgency of revising the Act into a truly useful tool for protecting human health and the environment cannot be over-emphasized. The public assumes that the necessary regulatory tools are already in place. They are not. Revision of the Act should be one of the Government's top priorities.

The following discussion concentrates on fish habitat management for two reasons. First, it is the traditional jurisdictional basis for federal involvement with water pollution control at the local and national levels. Second, it has been the subject of difficult federal-provincial relations and interdepartmental frictions.

8.3.2 Fish Habitat Management

8.3.2.1 Introduction

Jurisdiction over fisheries has provided the federal government with its principal power over water pollution at the local or regional levels. The pertinent sections of the Fisheries Act were outlined in Chapter 2.

In 1983, the Department of Fisheries and Oceans published a discussion paper in which it outlined a proposed fish habitat management policy.[1] While the policy has not been finalized, it is not expected to be changed to any substantial degree. It applies to both the physical disruption and the chemical pollution of fish habitat.

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[1] Fisheries and Oceans, 1983. Toward a fish habitat management policy for the Department of Fisheries & Oceans, Ottawa.

8.3.2.2 Objective

The overall objectives proposed by Fisheries and Oceans are:

> "to conserve, restore and develop fish habitats to improve the production of Canada's fisheries resources for the benefit of present and future generations."

The sub-objectives are:

> "(a) to prevent damage to fish habitats supporting Canada's fisheries resources;
> to restore fish habitats in selected areas where economic or social benefits can be achieved through the fisheries resource; and,
> (c) to develop fish habitats in selected areas where the production of fisheries resources can be improved for the social and economic benefit of Canadians."

The basic principle behind the policy is that there will be no net loss of the productive capacity of those habitats that support Canada's fisheries resources.

8.3.2.3 Strategies

The objectives would be obtained through implementation of the following strategies:

(a) enforcing the Fisheries Act and incorporating habitat protection requirements in land and water use activities and projects;

(b) participation in cooperative resource planning to incorporate fish habitat priorities in air, land and water management;

(c) consultation with the public on major or controversial fish habitat issues and on the development of habitat policies and legislation;

(d) encouragement of community involvement in the conservation, restoration and development of fish habitat;

(e) restoration of the productive capacity of fish habitat, directly or in cooperation with others;

(f) investment to improve the natural productivity of habitats where economically feasible or socially desirable; and,

(g) scientific research on the conservation, restoration and development of fish habitats.

8.3.2.4 Strategy Implementation

Fisheries and Oceans face real difficulties in attempting to implement its new fish habitat management policy. First, the Fisheries Act, the principal legal tool for implementing the policy, is administered by the inland provinces, rather than Fisheries and Oceans. Second, Section 33 of that Act is administered by the Environmental Protection Service of Environment Canada. Fisheries and Oceans must either foster new levels of cooperation or find a way to retrieve the administration of their legislation.

Complicating the issue of administration of the Fisheries Act by provinces is the recent opinion of the Department of

Justice to the effect that the administration of sections of legislation providing ministerial discretion cannot be delegated. Section 31 of the Fisheries Act, dealing with the harmful alteration, disruption or destruction of fish habitat, is implemented primarily through discretionary powers; therefore, the inland provinces are administering federal legislation, a component of which they apparently are not empowered to deal with.

To date, the dilemma is unresolved. Fisheries and Oceans have long since withdrawn from day-to-day management of all fisheries in Ontario, Manitoba, Saskatchewan and Alberta and the fresh water fisheries of Quebec and British Columbia, excepting salmon. The federal government's traditional interests have been concentrated on the commercial fisheries and consequently their fresh water habitat interests were largely confined to the Great Lakes and Lake Winnipeg regions plus the waters used by the anadromous salmon. The Department must now find a way to influence decisions or developments intruding on fish habitats throughout the provinces. How can this be done?

8.3.2.5 Physical Disruption of Habitat

Fisheries and Oceans have adopted two approaches in coastal provinces where it still administers the Fisheries Act. In New Brunswick and Nova Scotia, where there are fairly sophisticated water use licensing systems, referral procedures have been developed through which Fisheries and Oceans personnel have the opportunity to contribute to the terms and conditions of licences. The approach appears to have produced reasonable results.

For both Newfoundland and coastal British Columbia, the Department has established its own approval system. Shoreline developers or water users must seek approval from Fisheries and Oceans as well as obtaining the usual provincial permit or licence. A duel review system of this nature presents a high risk or both federal-provincial conflict and licence applicant frustration. There must be ways to build on the approaches used in the Maritimes to effect a single cooperative approval system.

Achievement of a federal-provincial approach may well require a modification of Fisheries and Oceans "no net loss" working principle for fish habitat management. Adoption of the principle is understandable. In the benefit-cost analysis of most projects, fish habitat would come out the loser. The fisheries manager sees a gradual dimunition of habitat quality and quantity and calls out for a halt. From a socio-economic point of view, however, a rigid application of the principle would not stand the test in many situations. The Department will have to develop a rather clear set of working strategies that will permit an element of flexibility in its approach to project proposal reviews.

> IT IS RECOMMENDED that Fisheries and Oceans seek the cooperation of the ICW and provincial departments in developing a working manual for implementation of its fish habitat policy.

If this approach proves successful, the obstacles to developing a simple, cooperatively administered water/fish habitat licensing system would be largely overcome.

8.3.2.6 Chemical Disruption of Habitat

Section 33 of the Fisheries Act covers the regulation of deposits of substances deleterious to fish. By interdepartmental agreement it is administered by the Environmental Protection Service (EPS) of Environment Canada. Through

9. FLOOD DAMAGE REDUCTION PROGRAM

Accords for the Protection and Enhancement of the Environment, the provinces, in turn, have undertaken to implement "national baseline requirements" for specific industrial groups and effluents. Thus, with respect to chemical pollutants, Fisheries and Oceans finds itself two steps removed from the effluent producers.

Until 1977, EPS concerned itself with the development of national effluent quality regulations that were issued under the Fisheries Act. At that time the government apparently became reluctant to issue additional regulations. EPS has continue to develop guidelines and codes of good industrial practice for use by the provinces in establishing pollution control requirements.

There have been instances, particularly in coastal British Columbia, where habitat managers of Fisheries and Oceans have felt that measures applied by the Province with the apparent concurrence of EPS were insufficient to protect important fish habitat areas. In these situations, Fisheries and Oceans has dealt directly with the industry involved. This type of situation should not be allowed to prevail. It creates too much uncertainty for industry.

It is understood that a new memorandum of understanding is being worked out between Fisheries and Oceans and Environment (EPS) to deal with the difficulties, but its contents are not available. The arrangements eventually agreed to should consider the following points.

First, the federal government must decide whether or not it is going to exert a regulatory role. Since 1977, there has been some doubt as to its intentions. Adding to this doubt is a new approach adopted by EPS a few years ago -- an advocacy role -- a role in which EPS would publicly draw attention to pollution issues and recommend measures for dealing with them. Having merits in its own right, the advocacy approach implies a reduced federal regulatory program, or it seems to. It may be perceived as a thrusting of responsibilities onto the provinces -- making them the "bad guys" so to speak. "Bad" to industry for demanding expensive pollution control measures and "bad" to public for not being stringent enough. How can the situation be clarified, agency involvement simplified, the public satisfied, and fish habitat protected?

> IT IS RECOMMENDED that the federal government adopt the following principles respecting its involvement with fish habitat quality management and other aspects of water pollution control within its jurisdiction.
>
> 1. The government shall exercise its jurisdictional responsibilities respecting water pollution control.
>
> 2. The government shall maintain a single water pollution regulatory agency (EPS) to set and enforce effluent quality requirements.
>
> 3. EPS shall continue to establish minimum national baseline requirements for industrial effluents.
>
> 4. National minimum baseline requirements will be based on the advice of National Health & Welfare, Fisheries & Oceans, the Canadian Wildlife Service and other departments as appropriate, industry and the provinces.
>
> 5. Site-specific requirements for an individual industrial location shall be determined by Fisheries & Oceans in consultation with the province, so that they may be integrated with other socio-economic needs.
>
> 6. Environment Canada and Fisheries & Oceans shall endeavour to negotiate new "accords" with the provinces whereby provinces will undertake to administer federal requirements, with appropriate provisions for federal cost-sharing of this administration.

8.3.3 Federal-Provincial Cooperation

The desirability of combining the water pollution control strategies of the federal and provincial governments was recognized in the early '70's and eventually culminated as part of agreements known as Accords for the Protection and Enhancement of Environmental Quality. The intent was to provide a "one window" approach to the public so that industries would only have one bureaucracy to deal with.

The degree of success of the Accords would be described differently in different parts of the country. In some coastal provinces, frictions sill exist with provinces perceiving some national baseline standards to be closer to standards based on best available technology and beyond the requirements of fisheries protection. As already noted, however, Fisheries and Oceans have complained that in some situations, the requirements are not stringent enough. Probably all would agree that the Accords were a step in the right direction. How could they be improved?

When the Accords were first negotiated, the main issue was the implementation of the requirements of Section 33 of the Fisheries Act. Although the Accords provided for consultation on a broad range of environmental issues and anticipated additional agreements on various programs related to pollution control, sub-agreements have not evolved. The concentration has been on effluent quality regulation.

Since 1975, new issues have become prominent. Acid rain, toxic substances and the disposal of hazardous wastes are examples. The federal government has enacted the Environmental Contaminants Act providing for control of substances dangerous to human health or environmental quality. Fiscal restraint at both levels of government makes duplication of effort even less tolerable than before. New Accords are needed involving more components of Environment Canada than EPS, and drawing on the expertise of National Health and Welfare to encompass this broader range of priority concerns and to stimulate the evolution of sub-agreements on priority issues. Sub-agreements should treat cost-sharing and work-sharing as well as the traditional "who does what".

It is understood that initial discussions have already begun with some provinces toward the negotiation of new Accords and this initiative is applauded.

> IT IS RECOMMENDED that Environment Canada pursue discussions with provinces to develop new agreements for cooperation on environmental management under which sub-agreements would be fostered on specific issues where work-sharing and cost-sharing would be emphasized.

9. FLOOD DAMAGE REDUCTION PROGRAM

9.1 Introduction

With few exceptions, Canada's population and economic investments have occurred along its major watercourses, often in flood-prone river valleys. In recent memory, major floods of disaster proportions have occurred in the lower Fraser Valley (1948), Winnipeg (1950), Toronto (1954), Montreal (1974 and 1976), the St. John River Valley (1973), and the Red River Valley (1979).

In addition to providing emergency flood fighting and evacuation assistance, the government has provided financial disaster relief to help restore flood-damaged homes and public facilities. Prior to 1970, financial assistance decisions were on an "ad hoc" basis. In 1970, a formal policy was adopted to assist provincial governments when costs exceed what a provincial government could reasonably be expected to pay. As per capita costs and damages increase to a provincial government, federal cost-sharing increases progressively as follows:

Provincial Costs Per Capita Eligible for Sharing	Federal Share
First dollar	0
Second and third dollars	50%
Fourth and fifth dollars	75%
Excess	90%

From 1970 to 1982, more than $80 million had been contributed by the federal government.

Besides disaster relief, the government has contributed to the costs of constructing structural works -- dykes and dams. Included have been the Winnipeg Floodway, Red River Community Dyking, the Shellmouth Reservoir, and the Assiniboine River Diversion among others. Under the Canada Water Conservation Assistance Act (1953), assistance under a fixed sharing formula was available for the construction of works for water conservation. Ontario made use of this Act to help finance flood control works in the metropolitan Toronto and Upper Thames regions. Some $70 million were contributed to these projects. The Fraser River Flood Control Agreement provides for a joint total expenditure of $120 million of which more than $100 million have been expended. The implementation agreements that followed the comprehensive river basin studies of the Qu'Appelle and Okanagan contained funds for flood control works. Some $9 million of federal contributions were committed to the Qu'Appelle and $1.5 million to the Okanagan.

As the population and industrial development of flood-prone areas continues to grow so does the potential for major disasters. Without land use regulations, dyking may actually encourage development in low lying areas and increase the risk of eventual disasters.

9.2 The Flood Damage Reduction Policy

In 1975, the Government adopted a more comprehensive approach with the objective of reducing future potential flood losses. Delivered through Environment Canada, the basic objective of the program is to discourage development on flood-prone lands and subsequent claims for disaster assistance and proposals to construct expansive structural flood control works. The strategy has been to enter 50:50 cost-sharing agreements with each province to:

(a) map and designate flood risk areas and floodways therein as appropriate;
(b) discourage new damage prone developments within the designated areas; and,
(c) examine all practical structural and non-structural alternatives and make selections based on effectiveness, cost, corollary benefits and environmental impact.

The General Agreements also provide that in those situations where floodways are designated within the designated flood risk areas, federal and provincial assistance programs may be applied outside the floodway but within the designated flood risk areas as long as any undertakings so constructed are adequately flood proofed.

Flood Risk Mapping Agreements that accompany the General Agreements provide a list of populated flood-prone areas for which flood risk areas and, if appropriate, floodways are to be mapped. The technical hydrologic, hydraulic survey and mapping specifications are set out. Provision is made for the Ministers to designate flood risk areas. Provisions are also included for the publication of maps and reports, their circulation to appropriate authorities and people and the initiation of a public information program.

A major precondition of the program was to gain the cooperation of the numerous federal agencies whose own programs could influence development in flood-prone areas. Agreements were effected through the Interdepartmental Committee on Water and confirmed by the Government. It was agreed that development assistance programs would not be available for undertakings within flood risk areas as designated through the federal-provincial Flood Damage Reduction Program. Major assistance programs under the

Regional Incentives Development Act and the National Housing Act, for example, are not available in the designated areas. The federal disaster financial assistance program will not apply to damages to new structures built in the designated areas. Numerous other federal agencies have agreed to take account of the commitments and constraints of the Flood Damage Reduction Program.

Where programs support land uses that are suitable to flood-prone areas, particularly those of the Department of Agriculture, they are not affected by the designation processes.

Where flood damage reduction measures seem to be required within the designated areas, the Flood Damage Reduction Program includes provisions for additional federal-provincial agreements respecting studies that may be required; flood forecasting and warning systems; flood proofing techniques; land use planning; works to control water levels and flows; and, the acquisition of property to reduce flood damage potential.

Provinces entering agreements under the Program commit themselves not to engage in or assist in new undertakings that would be vulnerable to damages in areas that become designated as flood risk areas. Provinces also agree to encourage land-use zoning appropriate to flood risk areas.

9.3 The FDR Program

By August 31, 1984, General Agreements Respecting Flood Damage Reduction and Flood Risk Mapping Agreements had been signed with all provinces except P.E.I., Alberta and

British Columbia. An equivalent memorandum of understanding had been signed by the Ministers of Environment Canada and Indian Affairs and Northern Development respecting the Northwest Territories but not for Yukon.

Total costs of the agreements amount to $71,754,000 of which $22,615,000 is for flood risk mapping, $6,130,000 for flood reduction studies, $2,000,000 for flood forecasting, and $41,009,000 for dykes, dams and other works. Provincial figures are shown in Table 9.1.

In the seven provinces and the Northwest Territories, all communities subject to significant flooding have been identified on schedules attached to the individual agreements and mapping, studies and works are in various stages of completion. Areas for which mapping has been completed and flood risk areas designated by the province are listed in Table 9.2.

Flood control works are in various stages of completion in areas in the vicinity of St. John, N.B.; Montreal, Québec and Richmond, Québec; several communities in the Red River Valley; and, near Hay River, NWT.

Some difficulties have been encountered in Ontario, Manitoba and Saskatchewan where residents of some communities have expressed concerns over the potential impact of flood risk designations on land values. In Ontario, the situation was further complicated by the decision to employ "event" floods, such as Hurricane Hazel, over rather large areas rather than a "once per 100 years" design flood. The latter problems have apparently been resolved by Ontario.

Table 9.1

FEDERAL-PROVINCIAL FLOOD DAMAGE REDUCTION AGREEMENTS

August 31, 1984

		Duration	Total Cost ($) **	Locations of Application of Agreement	Status
Newfoundland	General Agreement Respecting Flood Damage Reduction	12 years*	NA	NA	Signed: 5/81
	An Agreement Respecting Flood Risk Mapping	7 years*	1,470,000*	11*	Signed: 5/81
	An Agreement Respecting Studies for Flood Damage Reduction	5 years	480,000	3	Signed: 6/83
Nova Scotia	A General Agreement Respecting Flood Damage Reduction	16 years*	NA	NA	Signed: 6/78
	An Agreement Respecting Flood Risk Mapping	11 years*	1,030,000*	5*	Signed: 6/78
	An Agreement Respecting Studies for Flood Damage Reduction	11 years*	670,000*	2	Signed: 6/78
New Brunswick	General Agreement Respecting Flood Damage Reduction	15 years*	NA	NA	Signed: 3/76
	An Agreement Respecting Flood Risk Mapping	10 years*	2,000,000*	10*	Signed: 3/76
	An Agreement Respecting Studies for Flood Damage Reduction	10 years*	200,000	3	Signed: 3/76
	An Agreement on Flood Forecasting for the Saint John River Basin	10 years*	1,400,000*	NA	Signed: 8/77
	An Agreement on Flood Damage Reduction for Marsh Creek Watershed	6.5 years*	2,010,000	NA	Signed: 9/77
	An Agreement on Petitcodiac Sea Dykes	3 months	160,000	NA	Signed: 1/79
Quebec	An Agreement Respecting Flood Risk Mapping Applied to Flood Damage Reduction	16 years* (11 years mapping)*	6,000,000*	375*	Signed: 10/76
	An Agreement Respecting Dykes and Flow Regulation Works in the Montreal Region	7.5 years*	16,056,000	NA	Signed: 10/76
	An Agreement Respecting Flood Damage Reduction within the Limits of the City of Quebec	2 years	833,000	NA	Signed: 7/83
	An Agreement Respecting Flood Damage Reduction on the Mille Iles River	3.5 years	13,100,000	NA	Signed: 12/83
	An Agreement Respecting Flood Damage Reduction on the Saint-François River within the Limits of the Town of Richmond	3 years	4,350,000	NA	Signed: 5/84
Ontario	An Agreement Respecting Flood Risk Mapping and Other Flood Damage Reduction Measures in the Province of Ontario	12 years* (7 years mapping)*	1,200,000 (other) 8,000,000 (mapping)	***	Signed: 3/78
Manitoba	General Agreement Respecting Flood Damage Reduction	14 years*	NA	NA	Signed: 12/76
	An Agreement Respecting Flood Risk Mapping	8 years*	2,190,000*	45*	Signed: 12/76
	An Agreement Respecting Studies for Flood Damage Reduction	9 years*	310,000	14	Signed: 12/76
	An Agreement Respecting Flood Forecasting	5 years*	600,000	4	Signed: 3/81
	An Agreement Respecting the Upgrading of Ring Dykes in Certain Communities in the Red River Valley	3 years	4,500,000	8	Signed: 3/83
Saskatchewan	General Agreement Respecting Flood Damage Reduction Through Flood Area Management	10 years	NA	NA	Signed: 4/77
	An Agreement Respecting Flood Hazard Mapping and Studies	5 years	1,300,000 (mapping) 480,000 (studies)	30 14	Signed: 4/77
Yukon and N.W.T.	DOE/DIAND Memorandum of Understanding Respecting Flood Damage Reduction in the Territories	2 years	225,000	Hay River	Signed: 7/76
	DOE/DIAND Memorandum of Understanding Respecting Flood Damage Reduction in the Northwest Territories	10 years (5 years mapping)	400,000	7	Signed: 5/79
	An Agreement Respecting Flood Damage Reduction and Flood Risk Mapping (Canada/NWT)	10 years	NA	NA	Signed: 5/79

* Includes additional time or money or alteration in the locations for application of the agreement since original agreement signed.

** These costs are to be shared equally by the federal and provincial governments except for:

a) federal: 33 1/3%, provincial/local: 66 2/3% - An Agreement on Flood Damage Reduction for Marsh Creek

b) federal: 45%, provincial/local: 55% - An Agreement Respecting Dykes and Flow Regulation Works in the Montreal Region / An Agreement Respecting the Upgrading of Ring Dykes in Certain Communities in the Red River Valley / An Agreement Respecting Flood Damage Reduction within the limits of the City of Quebec / 'Other...Measures' part of An Agreement Respecting Flood Risk Mapping and Other Flood Damage Reduction Measures in the Province of Ontario / An Agreement Respecting Flood Damage Reduction on the Mille Iles River / An Agreement Respecting Flood Damage Reduction on the Saint-François River within the Limits of the Town of Richmond.

c) Yukon and N.W.T. costs shared equally by DOE and DIAND

*** Agreement applied to flood vulnerable sections of

a) streams, rivers and Great Lakes shorelines under the jurisdiction of 39 Conservation Authorities

b) 20 river systems not under the jurisdiction of Conservation Authorities

September 30, 1984

Table 9.2

DESIGNATIONS TO DATE UNDER THE FLOOD DAMAGE REDUCTION PROGRAM

LOCATION	NUMBER OF COMMUNITIES MAPPED	NUMBER OF PUBLIC INFO. MAPS	POPULATION[1]	DATE OF DESIGNATION
NEWFOUNDLAND				
Stephenville*	2	1	9 000	June 84
1 designation	2	1	9 000	
NOVA SCOTIA				
East River*	5	1	16 900	Feb. 84
Sackville River*	3	1	7 100	Feb. 84
2 designations	8	2	24 000	
NEW BRUNSWICK				
Fredericton*	10	1	65 000	Feb. 80
Perth/Andover	2	1	1 900	Feb. 80
Oromocto to Lower Jemseg*	16	1	15 000	Mar. 81
Lower Fredericton to Lincoln*	3	1	3 000	Feb. 82
Sussex*	15	1	5 000	Sept. 82
Keswick*	5	1	1 100	Mar. 83
6 designations	51	6	91 000	
QUEBEC				
Montréal Region*	38	22	1 940 000	May 78
Chaudière Basin*	19	8	50 000	Mar. 79
Gatineau/Ottawa Rivers*	23	15	283 000	Oct. 79
Upper Richelieu River*	21	11	80 000	Apr. 80
du Gouffre*	4	2	9 000	Apr. 80
Lower Richelieu River*	21	10	125 000	Nov. 81
Rivière Assomption*	12	4	94 000	May 82
Rivière Saint-François*	14	6	170 000	Oct. 82
Rivière Yamaska*	19	12	64 000	June 83
Rivière Bécancour*	4	2	14 000	May 84
Rivière Nicolet Basin*	10	3	73 000	May 84
Trois-Rivières-Ouest	1	5	13 000	Aug. 84
12 designations	186	100	2 915 000	
ONTARIO				
White River	1	1	1 000	Aug. 82
Toronto*	24	8	3 000 000	Dec. 82
Sturgeon River/Lake Nipissing/ French River*	9	5	63 000	Mar. 83
Kaministiquia River*	2	1	39 000	Aug. 83
4 designations	36	15	3 103 000	
MANITOBA				
Melita	1	1	1 200	Dec. 79
Wawanesa	1	1	500	Dec. 79
Winnipeg	1	1	565 000	Feb. 80
Souris	1	1	1 750	Oct. 80
Elie	1	1	450	Nov. 80
Brandon	1	1	36 250	Mar. 82
La Salle	1	1	350	Nov. 82
Sanford	1	1	400	Nov. 82
Starbuck	1	1	225	Nov. 82
Swan River	1	1	3 800	May 83
Dauphin	1	1	9 000	Feb. 84
Carman	1	1	2 400	June 84
Lorette	1	1	1 100	Sept. 84
13 designations	13	13	622 425	
SASKATCHEWAN				
Estevan	1	1	9 200	Aug. 80
Oxbow	1	1	1 200	Aug. 80
Roche Percée	1	1	150	Aug. 80
Moose Jaw	1	1	34 000	Oct. 81
4 designations	4	4	44 550	
NORTHWEST TERRITORIES				
Hay River*	2	1	2 900	May 84
1 designation	2	1	2 900	
43 designations	302	142	6 811 875	

* These designations are on a regional or river basin basis and cover a number of municipalities or parts of municipalities.

1. Figures are approximate and based on 1981 Census data.

Community concerns seem to have been resolved in Manitoba and Saskatchewan. The latter is renegotiating its agreement, allowed to lapse while it established a new Water Corporation and reviewed its water management policies.

It is probable that local problems could have been minimized had communities been fully involved and informed about the Flood Damage Reduction Program while it was still in the proposal stage. While this aspect had been left rightly to the provinces, they themselves had not been involved with the Program until it had become a firm federal policy. Because of unique locational problems, it would be desirable to add more flexibility to accommodate local special situations so that undue land value depreciation will not occur. This may require additional flood control works.

No agreement exists with Prince Edward Island since both governments were of the opinion that the program was not necessary there.

Agreements have yet to be entered into with Alberta and British Columbia, primarily for technical reasons, or so it would appear. There is some concern that if these two provinces do not enter the program shortly, an inequitable situation will result with the federal disaster relief and other programs still applicable throughout those provinces while being restricted in the other seven provinces. Both Alberta and British Columbia have a high potential for flood losses. In British Columbia, the problem is particularly acute because of the location of communities in river valley and delta settings. In Alberta, the rapid development of low lying areas in the Bow River Valley in the Calgary area is creating the potential for heavy losses. Both provinces have mapped many flood-prone areas on their own, but much more needs to be done.

Should negotiations not reach fruition within a reasonable time, it may become necessary for the federal government to initiate its own flood risk mapping program in the two provinces to meet at least part of its original objective of reducing disaster-assistance claims and to ensure equitable treatment across Canada.

The Flood Damage Reduction Program began during the 1976-77 fiscal year and is expected to be completed in the early 1990's. Assuming the entry of Alberta, British Columbia, Yukon and Indian Reserves into the Flood Damage Reduction Program, the total costs of mapping, studies and flood forecasting is expected to reach $32,800,000 in current dollars. The federal share will be half of that amount. While a full evaluation of the program is pending, the approach offers great promise, particularly if it is carried through on the provincial and municipal levels to include land use restrictions in the designated flood risk areas. In addition to lessening the rate of flood damage increase, government relief and the necessity to invest in more expensive control works, the program would slow the rate of conversion of prime valley agricultural land to urban development. The Flood Damage Reduction Program provides one example of a government program that, while reactive to a bad situation, is forward-looking in attempting to guide future development to more appropriate areas, reducing potential losses and keeping land in more appropriate uses.

10. REGIONAL WATER DEVELOPMENT

10. REGIONAL WATER DEVELOPMENT

10.1 Introduction

With the exception of navigational facilities such as the St. Lawrence Seaway, and hydroelectric facilities on federal lands, the federal government rarely becomes directly involved in the development and operation of water resources on a regional basis. Its roles are usually confined to monitoring, research and planning in cooperation with provinces as precursors to development or in support of international or interprovincial agreements to regulate developments. Its program implementation roles have normally been confined to financial assistance for such things as dyking in high risk/high value areas like the lower Fraser River valley, or for pollution control programs such as that on the lower Great Lakes.

An exception to these traditional roles is found with the Prairie Farm Rehabilitation Administration (PFRA). Established by legislation in 1935 to counter the effects of the severe drought of the 1930's on the southern prairies, PFRA continues 50 years later as an active developer and operator of local and regional water supply systems for farm and community use.

10.2 Prairie Farm Rehabilitation Administration

10.2.1 Objective

The objective of PFRA, as defined in its enabling legislation, is to secure rehabilitation of drought and soil drifting areas and promote systems of farm practice, tree culture, water supply, land utilization and land settlement that will accord greater economic security.

10.2.2 Water Program

PFRA offers a variety of water development programs on the southern prairies ranging from the provision of small water sources on individual farms through systems designed to meet the needs of small groups of farms, to large scale systems to irrigate substantial districts and provide secure municipal water supplies. PFRA also provides an engineering and planning service to assist the provinces in developing long range water supply and drought proofing programs.

At the farm level, PFRA offers free engineering assistance in selecting, surveying, designing and developing water sources for livestock watering, irrigation and domestic water supplies. Dugouts, small dams, wells and irrigation systems are included in this program. Engineering services are provided free of cost while financial contributions are provided for source development and irrigation works. Maximum financial contributions per project range up to about $2,500.

For groups of five or more farmers or ranchers and for small communities of less than 300 people, PFRA will provide all engineering services and contribute 50 percent of construction costs for surface or ground water source development and distribution systems. The community water supply component of this program does not apply in Alberta where the Province elected to develop its own systems.

Subsidiary to the DREE General Development Agreements between provinces and the federal government, both Saskatchewan and Manitoba entered agreements on water development and flood proofing, in 1979 and 1980 respectively. These agreements provided for development of strategies to improve the effectiveness of water management, analyses of supply and demand for water, drought sensitivity analyses, and the provision of water supplies and delivery systems.

Drought sensitivity models were developed for both provinces allowing analyses of the impacts of drought periods and the estimated effects of water development alternatives. Investigations of the sizes and production capabilities of ground aquifers were completed. The feasibility of several irrigation schemes was investigated. Water supply systems were improved or constructed for a number of communities in each province. Structural flood control measures, forecasting and warning systems for the Souris River were incorporated in the agreement with Saskatchewan.

The total cost of the agreement with Saskatchewan was $15.25 million shared as follows: PFRA - $7.4 million; Environment Canada - $0.5 million; Saskatchewan - $7.35 million. Of the total, $10.3 million was provided for water supply systems, equally cost-shared, with Saskatchewan adding the land required for developments and PFRA adding the engineering and administration of contracts.

The Manitoba agreement provided for $8.95 million with PFRA contributing $5.35 million and Manitoba $3.60 million.

PFRA's involvement in flood control work includes responsibility for the operation and maintenance of about 160 kilometres of dykes along the Assiniboine River from Portage la Prairie to Winnipeg.

With respect to irrigation, PFRA began constructing dams in southwestern Saskatchewan in 1935. The system now includes 26 dams, 23 of which are still operated by PFRA. The system serves some 19 120 hectares of land owned by PFRA, the Province and individuals. Forage crops are grown for livestock in the dryland farming area. The system also provides municipal water for Swift Current and three other towns.

The South Saskatchewan River Project was designed and constructed by PFRA. Original plans called for some 222 500 hectares to be irrigated. Only about 14 160 hectares have received irrigation to date. The Gardiner and Summit dams are operated by PFRA at the expense of the Province.

Beginning about 1910, Canada developed a number of reservoirs and aqueducts for irrigation in the St. Mary and Bow River Valleys. Under terms of a 1973 agreement, Alberta has assumed ownership of the works and PFRA undertook to rehabilitate them. Rehabilitation is expected to be completed in 1988 at a cost in excess of $36 million.

Finally, PFRA, under terms of agreements with Alberta, Saskatchewan and Manitoba, has been involved in a substantial program to provide water and sewerage works for communities other than the major cities. These programs are outlined in some detail in the chapter on "Municipal Sewage and Water Facilities".

10.2.3 Summary

As the above outline demonstrates, PFRA is intimately involved in water resource development on the southern prairies from the smallest dugout or well on an individual farm to water and sewerage systems for hamlets, towns and small cities, to the operation of flood control works and the construction and operation of regional irrigation reservoirs and distribution systems. PFRA's technical expertise includes specializations in dam design and construction, flood forecasting, flood control works, satellite imagery interpretations, and economic planning, among others.

PFRA maintains a staff complement of close to 900 person-years. Its 1984-85 gross budget is approximately $56 million. About $14 million is used for PFRA's community pasture program, tree nursery operations and demonstration farm, leaving some $42 million for water related projects. The following table (10.1), taken from the latest available report from PFRA, lists the agency's expenditures and revenues.

10.2.4 Comment

(a) The PFRA Role

The severe drought of the '30's that spawned PFRA has long since passed. From time to time proposals to wind it up have been discussed. The periodic recurrence of severe drought years like 1984, the high regard accorded PFRA by farming and ranching communities, and the interests of ministers have sustained it.

PFRA has developed a unique niche as a federal agency. It sees itself, and seems to be seen, as a water developer-operator working directly with farmers and the three provinces to meet local and provincial needs within the provincial jurisdictional domain. It exhibits a refreshingly strong client orientation, providing services to customers through more than 20 local offices.

The economics of the prairie provinces have grown dramatically over the last 50 years. No longer are they solely based on agriculture. They have industrialized, and two of the three have become relatively wealthy. The federal government must ask itself if the PFRA role remains appropriate to it.

Alberta has been assuming a stronger role in farm water management. In 1973, it agreed to assume the operations of

Table 10.1

PRAIRIE FARM REHABILITATION ADMINISTRATION

APPENDIX 1 EXPENDITURES AND REVENUE BY ACTIVITY[1]

	1980-81	1981-82	1982-83
Expenditures			
Headquarters Analysis, Planning and Program Development	$ 1 760 548	$ 1 747 026	$ 1 624 072
Headquarters Administrative Services	2 024 511	2 778 254	3 259 214
Engineering Technical Services	6 686 521	7 531 597	8 647 043
Soil and Water Conservation Technical Services	—	329 060	594 415
Construction Service Operations	709 342	849 512	890 853
Water Development Program Administration	2 453 260	2 921 826	3 413 291
On-Farm Water Development	4 238 247	5 783 356	4 904 613
Small Community and Group Water Development	—	111 418	619 216
Community Pasture Administration and Operations	7 427 723	7 839 147	8 908 640
Community Pasture Improvement and Development	2 226 953	1 572 414	1 488 212
Tree Distribution	2 000 071	1 812 048	2 325 691
Demonstration Farm	147 259	180 759	544 509
Agricultural Service Centres	2 359 976	2 382 797	1 076 782
Water Development and Drought Proofing:			
Manitoba Agreement	173 277	1 589 411	914 882
Saskatchewan Agreement	924 902	1 715 301	3 007 394
Southwest Saskatchewan Irrigation Projects	1 040 293	1 198 241	1 532 749
Alberta Irrigation Rehabilitation	717 239	178 720	60 868
South Saskatchewan River Project	191 235	320 054	367 149
Community Water Projects Program	24 083	35 949	10 233
Assiniboine River Diking	237 611	74 043	35 217
Herd Maintenance Assistance Program Administration	1 057 860	230 249	—
Herd Maintenance Assistance Contributions	42 887 046	2 093 436	—
Emergency Water Supply Program	311 744	490 275	—
	$79 599 701[2]	$43 764 893	$44 225 043
Revenue			
Community Pasture Operations	$ 5 967 088	$ 6 912 965	$ 8 448 147
Southwest Saskatchewan Irrigation Projects	225 311	197 356	215 919
General Revenue	3 393 914	3 320 725	2 792 251
	$ 9 586 313	$10 431 046	$11 456 317

[1] Includes operational expenditures, capital expenditures and contributions

[2] Does not include write-off of working capital advance $513 739 in fiscal 1980-81

Source: PFRA Annual Report, 1982-83.

PFRA irrigation systems as restored by PFRA. Since 1978, it has not taken advantage of PFRA programs to develop water supplies for agriculture based communities. The new Saskatchewan Water Corporation seems to be planning to take a more direct role as well.

If PFRA is to continue its present roles, and the decision is a political one, restricting its sphere of operations to the original "drought and soil drifting areas in the provinces of Manitoba, Saskatchewan, and Alberta", should be reconsidered. Indeed, PFRA has already operated in other dry areas such as Kamloops and Penticton in British Columbia. If federal assistance is to be made available to farmers and ranchers in one drought-prone area, it would only be equitable to extend the services to all drought-prone areas.

> IT IS RECOMMENDED that if the programs of PFRA are to be continued, they be extended to encompass all drought-prone areas of Canada.

(b) PFRA Programs and Federal Water Policy

As already noted, PFRA sees itself as a development agency serving local needs in response to provincial requests within their sphere of jurisdiction. Within this context, it may not find national water policies of the federal government particularly relevant to its own programs. It has its own legislated mandate to develop water resources for local use to mitigate the effects of drought. This independent approach was demonstrated in 1982 when PFRA sought the approval of the federal government to initiate new irrigation programs without first having submitted the proposals to the Interdepartmental Committee on Water (ICW). The role of the ICW is to review all major federal water initiatives to ensure that they fit within the federal water policy framework. In the end PFRA was advised to submit its proposals for ICW review.

The principal issue is that the federal government's perspective, being national or regional in scope, differs from that of a province. While a province would wish to obtain the maximum benefits from its share of a limited resource, the federal government would be interested in maximizing benefits within the region, the Saskatchewan-Nelson basin in this instance. If a unit volume of water would be worth more generating electricity in Manitoba than in growing crops in Saskatchewan, the federal government would presumably favour the former. How can such differences be accommodated?

First, there is nothing to prevent a downstream province from negotiating with an upstream province and offering to buy the flow that would otherwise be consumed through an irrigation program. Such negotiations would be based on the interests of individual provinces however, and the result of an interprovincial negotiation still might not be the most desirable from the regional or national perspective.

Second, the federal government could encourage formulation and adoption of a regional strategy, or plan against which major water development proposals would be judged. History suggests, however, that the individual prairie provinces might not be particularly interested in joining such an approach. The federal government tried to sell the idea during the discussions that over 20 years finally led to the apportionment agreements among the provinces. Central to those agreements was assurance to each province of a specified share and a right to decide independently on how that share was to be used.

Thirdly, the federal government could develop a comprehensive set of criteria that it would employ in analyzing the economic and social benefits and costs of water development proposals. These criteria would be explained to the provinces, preferably developed with their help. They would be used as the bases of analyses upon which the federal government would base its assistance decisions. This approach would be less intrusive on provincial rights than any of the others. It would also provide for responsible use of federal resources.

> IT IS RECOMMENDED that the federal government, in consultation with the provinces, develop and adopt a comprehensive set of criteria on which to base socio-economic analyses of water development proposals that would be used to guide federal program assistance decisions, including those respecting PFRA.

Adoption of this less intrusive role would leave the federal government with its vital role of honest broker or conciliator in interprovincial disputes.

11. REGIONAL WATER QUALITY MANAGEMENT

11. REGIONAL WATER QUALITY MANAGEMENT

11.1 Introduction

The federal government became involved in regional water quality management issues in the 1960's through the comprehensive river basin planning agreements introduced under the Canada Water Bill and a Canada-United States reference to the International Joint Commission concerning the quality of the lower Great Lakes. Federal-provincial river basin studies of the Okanagan, Qu'Appelle and Saint John rivers led to the identification of serious pollution problems and implementation agreements to effect pollution control measures, primarily municipal and industrial waste treatment facilities.

In some instances, federal-provincial planning agreements under the Canada Water Act focussed entirely on water quality issues. The Canada-Quebec agreement on the St. Lawrence River, 1972-1978, was of this nature, with the objective of preparing a plan to reclaim, protect and improve the water quality of the River. The implementation of that plan rests primarily with the Province, although the federal government contributed financially for sewage collection and treatment at Montreal and discussions are continuing that may lead to other federal-provincial cooperative measures.

A more complex regional water quality management endeavour is the Canada-British Columbia Fraser River Estuary Study initiated in 1977. The objective of this study was to develop a management program to guide future changes in the estuary so as to preserve and protect its environmental attributes while continuing its development as an economic resource. This integrated study of land and water use has involved a large number of federal, provincial and municipal agencies and many interest groups. It has led to the production in 1982 of a proposed management plan for the estuary that incorporated broad objectives, policy guidelines, and a recommended committee structure to move forward with more detailed planning and management of the estuary.[1] It is anticipated that a federal-provincial agreement to establish a management committee structure will be signed in 1985.

The major federal comprehensive involvement in regional water quality management, however, remains on the Great Lakes.

Although the first comprehensive report on pollution in the Great Lakes system was issued by the International Joint Commission in 1918, the current program has its origin in a joint Canada-United States reference to the IJC in 1964. The IJC was asked to determine whether Lake Erie, Lake Ontario and the international section of the St. Lawrence River were being polluted to the extent that injury to health or property was occurring. The IJC established advisory boards of representatives from the governments of both countries, bordering states and Ontario.

The advisory boards reported to the IJC in 1965 and submitted final reports in 1969. These led to an IJC report and recommendations to the two countries primarily concerned with municipal and industrial pollution with emphasis on eutrophication and the need to reduce the amounts of phosphates entering the Lakes.

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[1] Canada-British Columbia, 1982. A Living River by the Door. A Proposed Management Program for the Fraser River Estuary. B.C. Ministry of Environment, Surrey, B.C.

The first Canada-Ontario Agreement Respecting Great Lakes Water Quality was signed in 1971, reflecting the terms of agreement being developed between Canada and the United States that was finalized the following year. The initial Canada-Ontario Agreement was to cover a five-year period, but was extended on two ocassions and expired in 1982 when replaced by an entirely new agreement.

The initial agreements related primarily to the provision or upgrading of municipal sewage treatment systems with special measures for the removal of phosphates. Ontario agreed to require and assist municipalities to undertake the required measures and Canada provided financial assistance through CMHC. Other aspects of the first agreement related to work Ontario was to carry out to assist Canada in meeting its international obligations and the financial contributions Canada would make to Ontario in that regard. Ontario assumed responsibility for surveillance in the nearshore areas and research programs related to the impacts of urban drainage and the effects of the municipal pollution abatement program.

Related to these agreements Canada included a measure in the Canada Water Bill to permit the regulation of nutrients in household detergents and other cleaning agents. When the Bill was enacted, a regulation was issued limiting the concentration of phosphates in laundry products.

During the course of the original agreements, additional research by Canada and the United States led to the identification of new priority concerns, particularly toxic chemicals, and the need to adopt a comprehensive ecosystem approach to Great Lakes water quality management. On recommendations from the IJC, a revised Great Lakes Water Quality Agreement between Canada and the United States was signed in 1978.

11.2 The Great Lakes Water Quality Program

11.2.1 Objectives

The fundamental purpose of the Canada-U.S. and Canada-Ontario agreements "is to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem" through a maximum effort to develop a better understanding of the ecosystem and to eliminate or reduce to the maximum extent possible the discharge of pollutants into the Great Lakes System. In particular, Canada, the United States and Ontario adopted the policy that: "the discharge of toxic substances in toxic amounts be prohibited and the discharge of any or all persistent toxic substances be virtually eliminated".

The agreements specify five general water quality objectives for the Great Lakes system including freedom from:

(a) substances that will settle and form putrescent or otherwise objectionable sludge, or that will adversely affect aquatic life or wildlife;

(b) floating materials in amounts that are unsightly or deleterious;

(c) materials or heat that will produce colour, odour, taste or other conditions interfering with beneficial uses;

(d) materials and heat that along or in combination with other materials will produce toxic or harmful conditions for man, animal or aquatic life; and,

(e) nutrients in amounts that create growth of aquatic plants that interfere with beneficial uses.

11.2.2 Program

To meet the defined objectives, the Canada-United States Agreement contains the elements of 13 programs addressing:

(a) pollution from municipal sources - construction and operation of municipal waste treatment plants, including pretreatment requirements for industrial users;

(b) pollution from industrial sources - establishment of waste treatment or control requirements consistent with the achievement of the general and specific water quality objectives, and including requirements for the substantial elimination of persistent toxic substance discharges;

(c) inventory of pollution abatement requirements - including compliance schedules and status of compliance;

(d) eutrophication - construction and operation of municipal waste treatment facilities to meet specified objectives and reduction of phosphorus introduced from diffuse sources;

(e) pollution from agricultural, forestry and other land uses - including measures to regulate use of pesticides, measures to reduce animal-waste runoff, measures governing the hauling and disposal of wastes, review and supervision of road salting practices, control of soil losses, and incorporation of Great Lakes water quality objectives in land use planning;

(f) pollution from shipping - adoption of compatible regulations respecting the discharge of oil and other wastes from shipping and the establishment of a coordinated surveillance program;

(g) pollution from dredging activities - including development of criteria for identifying polluted sediments and compatible programs for the safe disposal of dredged material;

(h) pollution from onshore and offshore facilities - including programs and regulations for preventing discharges of oil and hazardous substances;

(i) hazardous polluting substances - maintenance of a list of such substances and measures to eliminate the risk of release thereof;

(j) persistent toxic substances - control programs for their production, use, distribution and disposal, including an inventory of sources, coordination of air, water and solid waste disposal programs, and joint Canada-United States disposal program;

(k) airborne pollutants - identification of sources and consultation on remedial measures;

(l) surveillance and monitoring - coordinated programs to assess compliance with pollution control requirements to assess achievement of objectives and to identify emerging problems; and,

(m) contingency plan - a joint plan to contain and clean up discharges of oil and hazardous polluting substances.

11.2.3 Canada-Ontario Agreement

The 1982 Canada-Ontario Agreement Respecting Great Lakes Water Quality reflects the revised Canada-U.S. Agreement. In essence, the Canada-Ontario Agreement calls for maximum efforts to develop a better understanding of the Great Lakes ecosystem and the elimination or maximum practicable reduction of the discharge of pollutants with emphasis on toxic substances and the completion of the municipal waste treatment program.

Terms of the Agreement provide for Canada to pay 50 percent of surveillance programs undertaken by Ontario as part of Canada's commitment under the Great Lakes International Surveillance Plan and 50 percent of approved research programs undertaken by Ontario. The maximum annual shareable costs are set at $2.4 million.

In addition, Canada agreed to contribute $65 million for the completion of a municipal waste treatment plant construction program to achieve the specific water quality objectives, including phosphorus reductions, agreed to by Canada and the United States.

The Agreement also provides for information exchange, coordination of programs and work sharing on certain programs.

The Ontario Government continues its responsibility for water quality surveillance in the nearshore of the effects of municipal, industrial and other waste discharges, and of the inflows of tributary waters, all as identified through the Great Lakes International Surveillance Program.

11.2.4 The Federal Roles

The major federal roles in the Great Lakes Water Quality Program are surveillance of water quality and the contamination of fish in the open lakes, research, and the regulation of pollution from commercial shipping. The departments involved are Environment, Fisheries and Oceans, Health and Welfare, Transport, Public Works, and Agriculture. Environment Canada's activities are shared by the Inland Waters Directorate, Canadian Wildlife Service, the Environmental Protection Service, Atmospheric Environment Service, and the Lands Directorate. Principal activities include the following:

DOE - surveillance of water and biota chemistry of open lakes, analytical laboratory services;

- lakes research respecting: wave action and impacts on shorelines and sediment movement; methodology in chemistry and microbiology for the analysis of pollutants in water, sediments, plants and animals; toxic chemicals characteristics, pathways and fates; aquatic recycling of nutrients; biochemical processes within the Lakes; environmental simulation modelling; groundwater contamination by toxic chemicals and their movements;
- monitoring of biotic accumulators of toxic substances;
- monitoring of atmospheric deposition of contaminants in the Lakes;
- research respecting waste treatment technology; and,
- research respecting the accumulation of contaminants in sediments, their recycling into the water column when disturbed, the contamination of sediments in dredging areas, disposal of dredged materials.

DFO - provision of ships for open lake surveillance programs;

- surveillance of contaminants in commercial, sport and forage fish; and,

- research to identify impacts of new chemicals, pathways of toxic into fish populations, identification of contaminated fish populations.

NHW - toxicity studies of substances found in the Lakes; and,

- advice to federal and provincial agencies on human health implications of contaminants.

MOT - development and enforcement of regulations respecting pollution from commercial shipping and related shore facilities.

DPW - manage dredging activities and sample dredged material for contaminants.

DOA - research into implications of agricultural practices on nutrient runoff to the Lakes.

Frustrations have been expressed about the limited role of the federal government in implementing the Canada-United States Great Lakes Water Quality Agreement. The federal role is primarily one of research, surveillance and the provision of funds to Ontario to undertake surveillance programs on behalf of Canada and to assist with capital expenditures for municipal sewage treatment plants. Implementation of actual control measures have been left to the Province. For other than a few substances, such as PCBs, little federal regulatory control is in place for the more than 800 substabces that have been identified in the Great Lakes, many of which may be toxic.

The situation arises from Canada's constitutional framework and provincial insistence on retaining authority over natural resources and local works and undertakings. Provinces do not wish direct federal involvement with pollution control regulation, be it from municipal, industrial or agricultural sources. This became abundantly clear more than a decade ago when Environment Canada's Environmental Protection Service began using Section 33 of the Fisheries Act to promulgate national effluent quality regulations for various industries and began to deal directly with individual plants to set pollution control requirements. Provinces perceived this activity as an attempt by the federal government to usurp water pollution control responsibilities from them, and an undesirable duplication of effort. The results have been a shifting of the federal role to a greater concentration on pollution control technology, development, technology transfer, and advocacy of environmental protection measures. In addition, federal-provincial accords on environmental protection were entered into with most provinces in 1975. Under these arrangements, Environment Canada agreed to work through the provinces on pollution control matters on the understanding that provinces would require control measures at least as stringent as agreed upon national baseline requirements. In addition to all this, the administration of the Fisheries Act had been transferred to inland provinces, including Ontario, some year ago.

Thus, the federal concerns. They have few legal tools with which to effect pollution control and one that they have, the Fisheries Act, is administered by Ontario and has hardly ever been used in a prosecution. While Canada must negotiate with the United States on international matters involving pollution control requirements in both countries, it cannot point to Canadian national control legislation that matches that of the United States.

There is a solution, an appropriate federal role, an avenue that the federal government has pursued in the past with provincial support. This has been to control potential pollutants of national significance at source. The Environmental Contaminants Act, Pest Control Products Act and Canada Water Act have been used to control the manufacture, importation and use of substances dangerous to human health and/or environmental quality. It has already been recommended in Chapter 2 that the Environmental Contaminants Act be amended to provide a registration process for chemical substances so that importation, processing, manufacture or use of those considered dangerous to human health or the integrity of the ecosystem may be prohibited or allowed under specific regulated conditions. Canada requires such legislation if it is to respond adequately to a 1980 recommendation of the IJC calling for the prohibition of the production, sale, transport or use of persistent synthetic organic compounds with known highly toxic effects whose use will result in their entry into the environment.

11.2.5 Financing the Program

In 1983-84, total federal funding for activities by its own agencies amounted to approximately $9.6 million. Of this amount, some $4.6 million was used by the Inland Waters Directorate for surveillance and research. Of the remaining $5.0 million, Fisheries and Oceans accounted for about $3.0 million, Health and Welfare, $1.0 million, and the other agencies, $1.0 million.

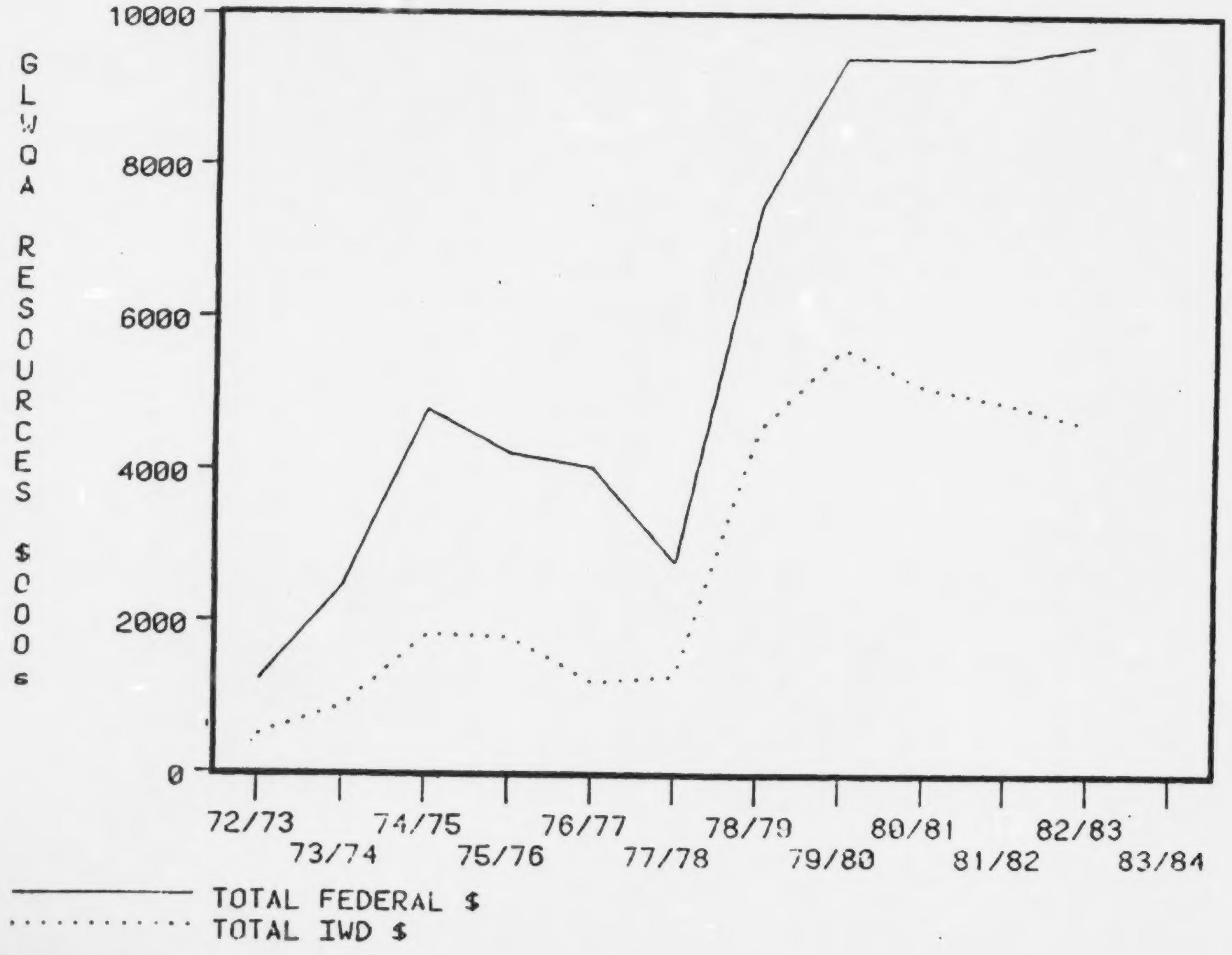
It has been estimated that about 60 percent of these expenditures are related to the toxic substances issue.

The accompanying chart depicts the changes in expenditures over the 11-year period from 1972-73 to 1982-83. The sharp rise in expenditures in 1978-79 and 1979-80 reflected the revised Canada-United States Agreement and the new emphasis on toxic chemicals and the adoption of a broad ecosystem approach to water quality management. Environment Canada's expenditures reached a peak in 1979-80, declining gradually since that time by a total of close to 20 percent. While some of this decline may be due to the government's financial restraint programs, some of it is known to be based on decisions that shifted some emphasis from the research program at the National Water Research Institute to the development of water quality objectives and the development of new agreements with Ontario. At the same time, the total federal commitment to the Great Lakes Program has not declined over the same period, suggesting changes in emphasis among programs of various agencies rather than the impact of financial restraint.

Financial problems do exist, however. For example, the Canada-Ontario Agreement provides for equal cost sharing of surveillance programs carried out by Ontario in support of Canada's commitments with the United States. Insufficient provision was made for rising costs which have risen to the extent that costs to Ontario have reached $3,2 million annually, while the shareable total was fixed at $2.4 million.

> IT IS RECOMMENDED that Canada adjust its commitment under the Canada-Ontario Agreement to return to the principle of equal cost-sharing of surveillance carried out by Ontario in support of Canada's international obligations.

FEDERAL AND IWD* RESOURCES FOR GLWQA ACTIVITIES



* IWD - Inland Waters Directorate, Environment Canada.

It is understood that a recent unpublished study for the Auditor General was critical of research projects at the National Water Research Institute in that some were more oriented to fundamental research than to the needs of clients. A shift in research program emphasis is anticipated, and this should help overcome the shortfall that may have developed in the Great Lakes Program's research needs.

There are also new areas of concern that have yet to be addressed that will require new resources. In 1980, the IJC presented a report with recommendations to the governments on "Pollution in the Great Lakes Basin from Lake Use Activities". This report recommended that Canada and the United States develop a comprehensive strategy for the control of pollution from nonpoint sources. Emphasis was placed on the requirement to modify agricultural and urban practices that produce polluted runoff. Fertilization, livestock operations, urban storm sewer drainage, and erosion from construction areas were all highlighted. While all these issues are primarily within the realms of provincial jurisdiction, federal cooperation will be necessary to encourage attainment of the desired results. Incentives or subsidies may become necessary to encourage farmers to adopt new approaches to manure storage, spreading and disposal techniques. Changes that may be necessary in the use of combined storm and sanitary sewer systems will be capital intensive, requiring assistance similar to that currently provided for sewage treatment facilities. Additional water monitoring programs of tributary streams and rivers may be required to evaluate the results of nonpoint pollution control programs. Without these new initiatives, the Great Lakes Water Quality Program may fail to reach its objectives.

IT IS RECOMMENDED that the federal government demonstrate its support of the IJC's recommendations concerning control of non-point source pollution by providing resources necessary for departments to cooperate with Ontario in tackling the problems.

11.2.6 Institutional Arrangements

(a) International

The Great Lakes Water Quality Program has become a multi-dimensional one, moving beyond the original focus on waste-water treatment at municipal and industrial outfalls. It now encompasses land management practices in agriculture, forestry and urban development, industrial and user practices relating to toxic chemicals, development of a better understanding of the sources, characteristics and effects of toxic pollutants, and programs to eliminate their entry into the lakes. In essence the Great Lakes Water Quality Program is assuming a comprehensive water basin management approach. It still lacks the major component related to consumptive use, but the stepwise approach to comprehensive management has been inevitable and encouraging.

A large number of jurisdictions and agencies of two national governments, eight states and one province are involved in aspects of this major ecosystem management problem. Drawing the pieces together into a cohesive coordinated force to produce effective solutions has been a difficult task. At the international level, the International Joint Commission plays the key role, assembling information from experts in both countries, considering the implications, identifying problems amd recommending courses of action to the two countries. The IJC is assisted in this endeavour by the Great Lakes Water Quality Board and the Great Lakes Science Board that advise the Commission on the state of the Lakes and on the scientific aspects thereof. Although the IJC does not have management authority to require the implementation of remedial programs, its high public profile has helped to ensure international attention to and eventual implementation of its recommendations.

From time to time, it has been suggested that the Boundary Waters Treaty should be renegotiated to define more clearly the general prohibition against pollution of waters that causes "injury to health or property" and to give more powers to the IJC. A more specific definition of pollution and its effects would be most difficult to accomplish and the end result would be a loss of flexibility that the current wording allows to the two countries working with good will. With respect to the authority of the IJC, Article X of the Boundary Waters Treaty already provides for a decision-making role for the Commission, should the nations agree to such a role with respect to a particular issue. Considering the relative development of the two countries since the Treaty was signed in 1909, it is most doubtful if Canada could achieve better terms of agreement today.

(b) Canadian

At the Canadian federal level, Environment Canada is the lead agency. Within Environment Canada, the Regional Director General of the Ontario Region serves as the focal point for managing Canada's Great Lakes Water Quality Program. He chairs a Departmental Committee charged with bringing together the expertise and resources of the various sectors of the Department to meet Canada's commitments under the Canada-United States Agreement. He chairs the Interdepartmental Great Lakes Working Group responsible for coordinating the contributions of all federal agencies. He co-chairs the Canada-Ontario Board of Review, responsible for implementing the Canada-Ontario Agreement. Finally, he serves as the

Canadian co-chairman of the international boards advising the IJC. The memberships and roles of the various coordinating bodies are outlined in Table 11.1.

(c) Federal-Provincial

The Canada-Ontario Agreement and coordination body, the Board of Review, are the envy of the United States Government that has not been successful in developing formal federal-state arrangements to pursue a coordinated approach to water quality improvement on the American side of the Lakes.

The Board of Review is co-chaired by Environment Canada's Regional Director General and the Ontario Ministry of Environment's Associate Deputy Minister. The Board includes three members from each government from the agencies most intimately involved with the program.

The Board's role is to administer the Canada-Ontario Agreement, reviewing the projects undertaken and recommending to Government respecting policies and programs required to meet Canada-United States water quality objectives (Figure 11.1).

The Board of Review is supported by a Coordinating Committee that includes two co-chairmen and representatives of the Board's other committees. The co-chairmen are also members of the Water Quality Program Committee of the IJC Great Lakes Water Quality Board. Thus, the Coordinating Committee is able to keep fully informed of Canadian and U.S. programs and ensure appropriate cooperation.

The Board of Review's Surveillance Committee has membership drawn from agencies involved with monitoring both nearshore and open water portions of the Lakes. The Committee undertakes an annual review of surveillance program objectives,

Table 11.1

COORDINATION OF THE GREAT LAKES WATER QUALITY PROGRAM

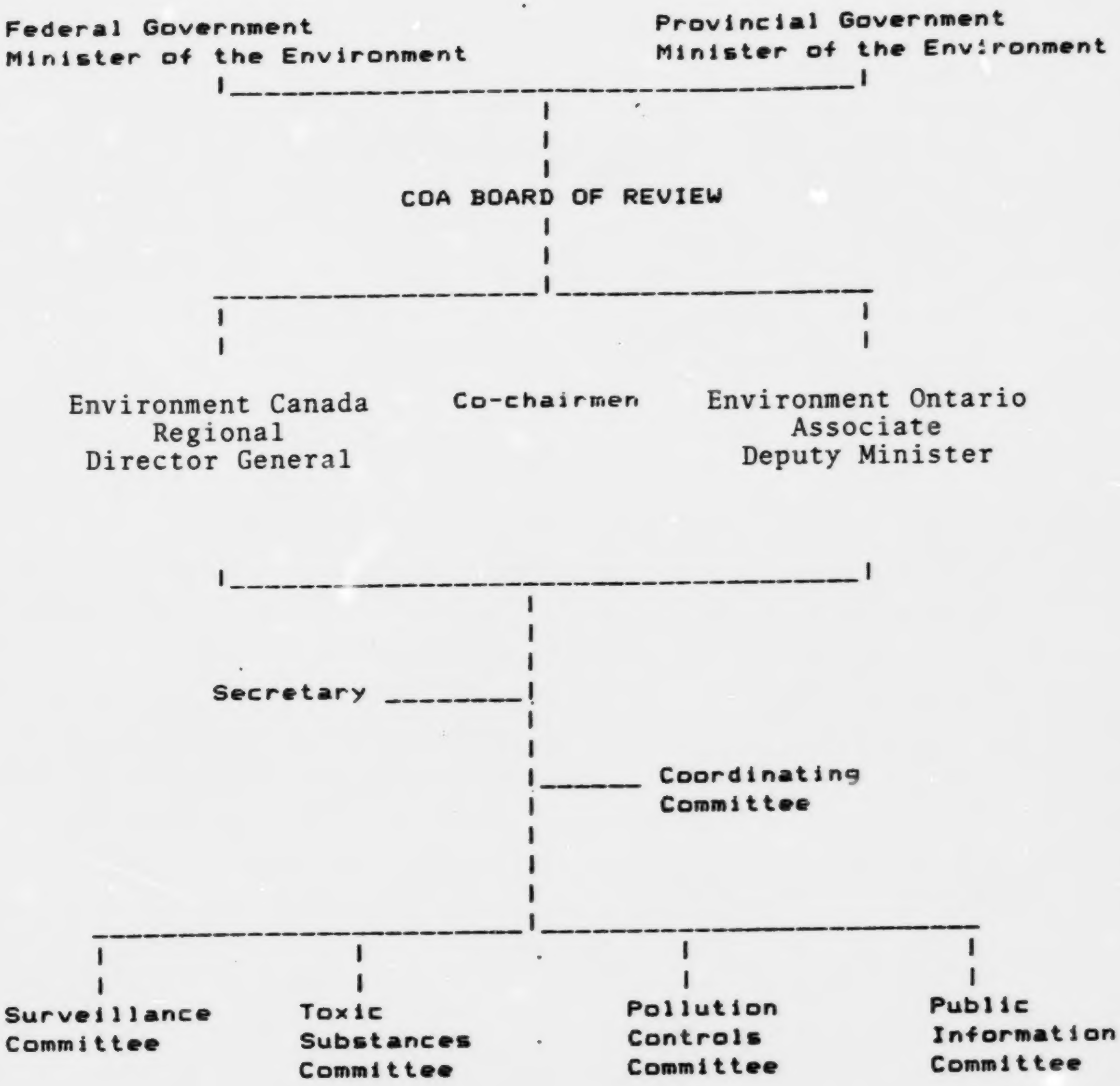
DEPARTMENTAL - DOE	INTERDEPARTMENTAL	INTERGOVERNMENTAL	INTERNATIONAL
Committee/Board			
GREAT LAKES	GREAT LAKES WORKING GROUP	BOARD OF REVIEW (CANADA-ONTARIO AGREEMENT)	A) GL WATER QUALITY BOARD B) GL SCIENCE ADVISORY BOARD
Reporting to			
DM of DOE	ICW*	Minister of Each Government	IJC**
Membership			
RDG Ontario ADMs	All federal departments: DOE, DFO, NHW, MOT, DOA, DPW, AECB, TB, FIN	Senior Federal& Provincial Officials	Senior Federal & Provincial Officials
Responsibilities			
TO BE DRIVING FORCE IN DOE as stated in DOE directive of Feb. '82.	ADVISES RDG (ONTARIO) ON:	ADVISES ON IMPLEMENTATION OF C.O.A.:	ADVISES IJC:
- develop effective policies, plans, coordinating and monitoring	- implementation of annual budget of $1.9 million	- allocation of resources, federal funds $1.2 million	a) senior advisory board to IJC concerning all aspect of the "state of the art" of the Great Lakes
- management of resources directly under control of committee	- interdepartmental coordination of A-Bases	- Sewage Treatment Facility funds of $65 million (Schedule G of C.O.A.)	b) science aspects of Great Lakes water quality
- negotiate commitments with DOE support managers	- establishes interdepartmental goals		
- establish steering committee for functional guidance to interdepartmental intergovernmental international bodies			
Chairman - DOE RDG Ontario	Chairman - DOE RDG Ontario (who is also responsible for coordinating interdepartmental activities)	Federal Co-chairman - DOE RDG Ontario (who is also responsible for federal implementation	Federal Co-chairman - DOE RDG Ontario (who is also responsible for federal implementation

* Interdepartmental Committee on Water

** International Joint Commission

Figure 11.1

CANADA-ONTARIO
GREAT LAKES PROGRAM


Federal Government
Minister of the Environment
Provincial Government
Minister of the Environment
COA BOARD OF REVIEW
Environment Canada
Regional
Director General
Co-chairmen
Environment Ontario
Associate
Deputy Minister
Secretary
Coordinating
Committee
Surveillance
Committee
Toxic
Substances
Committee
Pollution
Controls
Committee
Public
Information
Committee

plans, costs and anticipated results and recommends approval of program funding under terms of the Canada-Ontario Agreement.

The Toxic Substances Committee has federal and provincial membership drawn from all agencies working on the issue. The Committee identifies priority areas and issues, evaluates the programs of both governments for the Board, and effects exchange of information.

The Pollution Control Committee monitors research programs; pollution abatement and compliance programs; pollution from nonpoint sources, shipping, dredging; and, contingency planning. Basically, the Committee reports to the Board on progress being achieved with the various pollution control programs.

The Public Information Committee arranges publicity for Canada-Ontario Agreement programs, keeping the public informed on program activities and achievements.

In total, the Board of Review, with its supporting Committees, has provided a well-knit structure to assure mutual understanding of internal problems, encourage and effect co-ordination of programs, and exchange information.

(d) Federal Government

The coordinating role within a federal department or among several is a difficult one, more difficult that just a few years ago. When a new priority issue was identified a decade ago, new resources were often provided to address it. This was the case, for example, with federal-provincial river basin planning agreements. New planning studies were undertaken largely with new funds in addition to existing programs. The co-chairmen of a federal-provincial planning board had an identified budget with which to influence the priorities of other agencies and get tasks accomplished. The chairmen not only had responsibility to undertake a program, but were accountable for the effective use of a defined budget.

Times have changed. The coordinator or chairman of an interagency program often no longer has effective control over the resources required to achieve program objectives. The Treasury Board seldom approves new funding adequate to undertake a program. Instead, participating agencies are first required to re-examine their own priorities within their basic, or A-Base, budgets, and reallocate resources to the new priority issue. After this exercise is completed, marginal new funding may then be provided for new program initiatives.

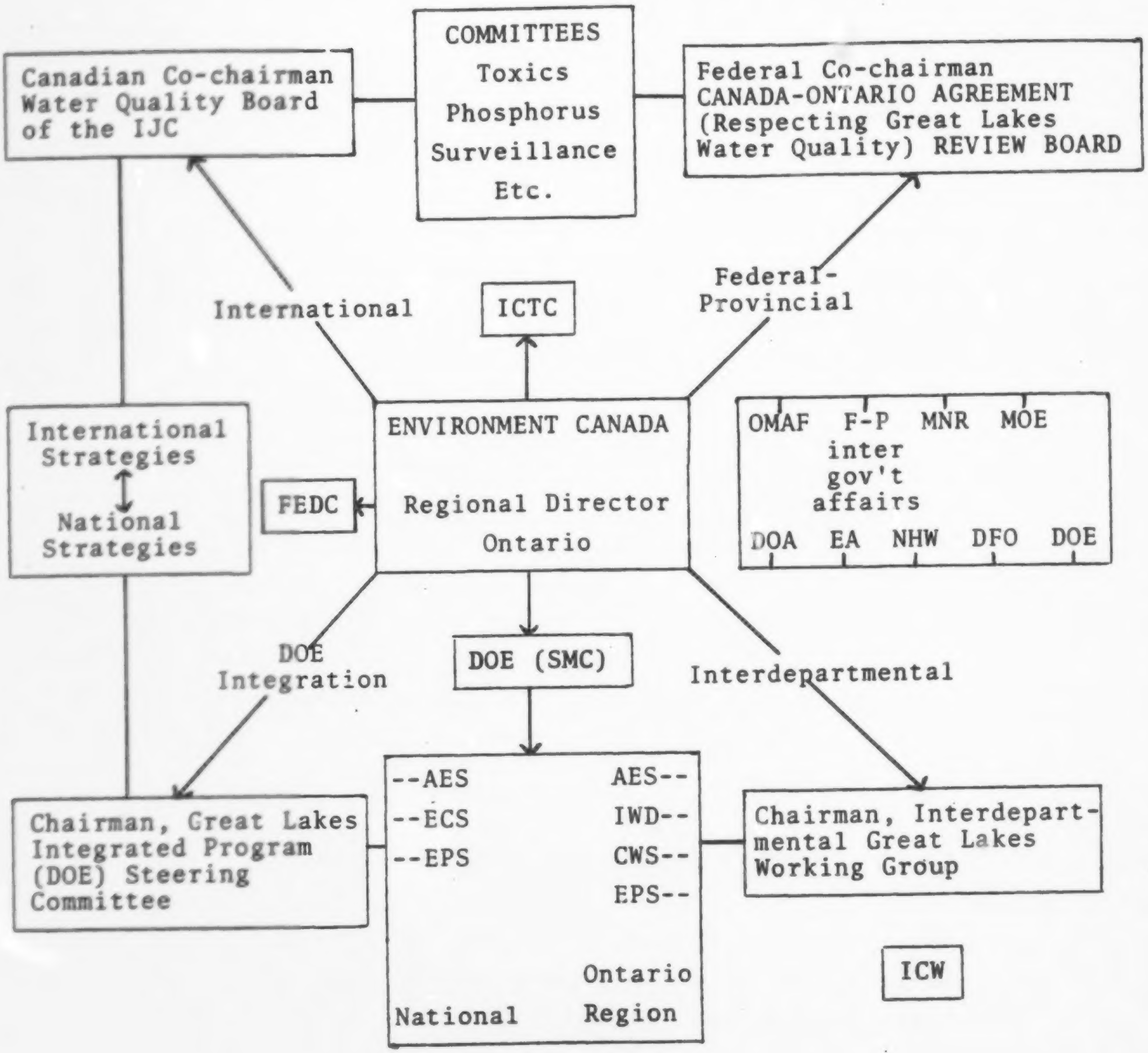
This process prevailed when the federal Treasury Board reviewed a joint submission of departments seeking resources to implement the 1978 Canada-United States Great Lakes Water Quality Agreement. A maximum annual expenditure level of $10 million was set, of which a discretionary allotment of some $1.9 million was provided for new commitments under the Canada-United States Agreement.

In some instances, the output of a particular current A-Base budget program may serve several objectives of a department. Within Environment Canada, for example, the Inland Waters Directorate's water quality monitoring program on the Great Lakes responds to requirements of the national water quality network, the national toxic chemicals control program, and the national acid rain program, as well as the Great Lakes Water Quality Program. Research program at the National Water Research Institute may be related to a variety of objectives, including fundamental research. The important task becomes one of adjusting A-Base budget projects to accommodate the objectives of a new program.

Rigidities can be overcome to an extent by judicious use of the $1.9 million of discretionary funds available to the Regional Director General and the Interdepartmental Great Lakes Working Group. Essential projects can be purchased from cooperating agencies. But if the discretionary funds are to be successfully used as a lever to effect changes in regular programs in response to the requirements of the Great Lakes Program, the members of the Great Lakes Working Group should have elements of line authority over their supporting services.

The management structure shown in Figure 11.2 is complex, but there seems to be no better alternative, particularly now that the focus of the Great Lakes Water Quality Program is shifting from the traditional control of point sources of pollution to nonpoint sources. The issues are no longer confined to water withdrawal, use, treatment and return to the watercourse. Agricultural, land development and urban maintenance practices within the basin are now parts of the scenario, as are industrial emissions to the atmosphere within and without the basin. These issues cannot be dealt with effectively by water management agencies alone. Cooperation is required of agencies and individuals with responsibilities for other natural resources, urban affairs, and economic development. The last group is particularly important for it may be through their support of industrial and urban renewal that pollution abatement is achieved as part of larger modernization programs.

Figure 11.2
FEDERAL
GREAT LAKES PROGRAM STRUCTURE


COMMITTEES
Toxics
Phosphorus
Surveillance
Etc.
Canadian Co-chairman Water Quality Board of the IJC
Federal Co-chairman CANADA-ONTARIO AGREEMENT (Respecting Great Lakes Water Quality) REVIEW BOARD
International
ICTC
Federal-Provincial
International Strategies
National Strategies
FEDC
ENVIRONMENT CANADA
Regional Director Ontario
OMAF
F-P
MNR
MOE
inter gov't affairs
DOA
EA
NHW
DFO
DOE
DOE Integration
DOE (SMC)
Interdepartmental
Chairman, Great Lakes Integrated Program (DOE) Steering Committee
--AES
--ECS
--EPS
AES--
IWD--
CWS--
EPS--
National
Ontario Region
Chairman, Interdepartmental Great Lakes Working Group
ICW

Source: Environment Canada

At the federal level a fundamental need is to ensure that the Great Lakes Program manager has sufficient resources and authority over them to implement his mandate. Within Environment Canada, this dictates the clear identification of the Great Lakes Water Quality Program as an "integrated" program, that is one to which resources of each component of the Department are specifically dedicated within departmental estimates to respond to program priorities of the Regional Director General. Thus, while the operational management of individual programs would remain the responsibility of the line managers within the Department, initial program selection for inclusion in the Great Lakes Program would rest with the Regional Director General.

> IT IS RECOMMENDED that Environment Canada treat the Great Lakes Water Quality Program as an "integrated" program, with overall priority selection and approval of components contributed by services of the Department resting with the Regional Director General and the Departmental Steering Committee.

Interdepartmentally, the Great Lakes Program would profit at the policy level from representation on a revitalized Interdepartmental Committee on Water and from designation as a priority issue by the Interdepartmental Committee on Toxic Chemicals.

11.2.7 Program Results and Future Directions

Nearly $2 billion have been invested in municipal sewerage works since the first Canada-Ontario Agreement on the Great Lakes was signed. Industry has also invested large sums.

There have been gratifying declining levels of phosphorus in Lakes Huron, Erie and Ontario. On the other hand, nitrogen loadings of Lakes Ontario and Huron show increases probably related to agricultural practices.

Herring Gull egg analyses programs have indicated declines in presence of six persistent organochlorine substances monitored, but concerns have been expressed over an apparent levelling off of the rate of decline. In some instances, contamination levels have remained essentially constant over the last few years.

The identification of the pesticide toxaphene in Lakes Superior and Huron indicate the complex dimensions of the Great Lakes Water Quality Program, This contaminant enters the lakes from airborne sources, travelling long distances from areas of use in the U.S.

Intensive surveillance programs in different sections of the Lakes systems continue to identify and trace contaminants to sources where corrective measures will be required. The most significant concern in this regard is the special Canada-U.S. study of the Niagara River that has identified a number of industrial dump sites in the United States that are leaking toxic chemicals into the River.

In general, Canadian officials directly involved with the Great Lakes Program are cautiously pleased with results so far. They see an urgent need for continued diligent application of effort, particularly to initiate programs to respond to IJC recommendations regarding nonpoint pollution, and to convince Americans to undertake clean-up operations of industrial dump sites. Concerns were expressed that reductions in financial and personnel resources assigned to the program could let successes begin to slip away. Continued diligence must be applied to the surveillance program and toxicological studies to determine the impacts of chemical contaminants found in the Lakes.

The current Canada-Ontario Agreement is coming to an end. Federal assistance for the major municipal waste treatment program will be completed. The cooperative surveillance and research programs that have been developed since 1971 must continue to be nurtured and supported if the Great Lakes Water Quality Program is to achieve the objectives recommended by the IJC.

In response to Article X, Section 3, of the Canada-United States Agreement, Canadian and American officials will meet in June 1985, to review progress and determine priorities for continuing programs on the Great Lakes.

> IT IS RECOMMENDED that Canada negotiate a revised Great Lakes Water Quality Agreement with Ontario, building on the levels of cooperation already achieved, particularly with respect to work sharing, and focussing on the critical issues of toxic chemicals and the reduction of pollution from non-point sources, and responding to Article X, Section 3, of the Canada-United States Agreement which will have implications with respect to changes in the Canada-United States Agreement.

12. MUNICIPAL SEWAGE AND WATER FACILITIES

12. MUNICIPAL SEWAGE AND WATER FACILITIES

12.1 Introduction

On January 18, 1985, newspapers carried reports on a new study of municipal infrastructure maintenance requirements that has been completed by the Federation of Canadian Municipalities.[1] The study apparently found that the average age of sewage treatment plants in Canada is 13 years, water treatment plants 23 years and sanitary sewers 30 years. The report is to be used to support requests for higher levels of federal and provincial funding to assist municipalities in maintaining essential services, roads, sewage and water systems in particular.

While the average ages quoted for sewage and water systems are not extreme, they are indicative of a problem that is growing as the economic climate of the country continues to dictate financial restraint measures by all levels of government. The federal government's involvement with municipal water and sewage systems decreased sharply after 1980 when financial assistance programs that had been available through the Canada Mortgage and Housing Corporation (CMHC) were withdrawn.

The following paragraphs outline major federal programs that have been available to assist municipalities.

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[1] Ottawa Citizen, 1985. $12B needed to fight urban rot: report. January 18, p. 2.

12.2 Canada Mortgage and Housing Corporation

Federal financial participation in municipal sewage and water systems began in 1938 with the Municipal Improvements Act (Bircham & Bond, 1984). Under this Act, a loan program was made available as an employment stimulator for a short period. Again from 1963 to 1966, as another employment stimulator, the Municipal Development and Loan Act made funds available for sewage facilities.

The major CMHC Sewage Treatment Program was initiated in 1960-61 as an amendment to the National Housing Act. Initially the new program was conceived in response to a weakening employment situation, but by the time it came into effect, employment had improved and the primary objective became pollution control. In particular, there was mounting evidence of ground water pollution resulting from construction of numerous residential subdivisions with septic services and well-water supplies.

Under the Sewage Treatment Program, low cost loans with a partial capital cost forgiveness feature were made available for construction of sewage collection and treatment works. Loans carried an interest rate some one to two percent below market rates available to municipalities. The loan forgiveness feature amounted to a grant of one-sixth of capital costs.

In 1975, the CMHC program was renamed as the Municipal Infrastructure Program and its eligibility was expanded to include regional planning for sewage and water and the provision of water supplies to newly developing areas.

In 1979, the Municipal Infrastructure Program was combined with others in a block-funding program referred to as the Community Services Contribution Program. The change to block funding was in recognition of provincial and municipal responsibility for local works and undertakings.

The three CMHC programs are summarized in Table 12.1, and the financing involved is summarized in Table 12.2. It has been estimated that between 1961 and 1980, CMHC loans subsidized about one-third of municipal capital costs for sewerage and water, and grants accounted for nearly one-tenth of those costs (Bircham & Bond, 1984). More than two billion dollars were provided as loans for some 4,500 projects, and grants totalling three-quarters of a billion dollars were contributed to 6,100 projects.

Funding for the Community Services Contribution Program was ended in 1980, removing CMHC from the financing of municipal facilities, except for a $65 million commitment transferred to Canada Water Act funding for pollution control works at Great Lakes municipalities. The government's reasoning for ending its program was based on four points[1]:

a) the question of whether it was appropriate for the federal government to continue funding services that were within provincial jurisdiction;

b) the question of the accountability of the government collecting the funds through taxation yet not being responsible for the expenditures;

c) the job creation effectiveness of the program did not match that of other programs; and,

d) fiscal restraint required reallocation of funds to programs of higher priority.

The block funding nature of the program made it difficult to ascertain whether funds were spent for intended pruposes.

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[1] Robert Bockstael, Parl. Sec. to Minister of Transport. Commons Debates. Jan. 18, 1981. p. 6352.

Table 12.1

COMPARISON OF THE THREE MUNICIPAL INFRASTRUCTURE PROGRAMS

Sewage Treatment Program, 1961-1974	Municipal Infrastructure Program, 1975-1978	Community Services Contribution Program, 1979 and 1980
Objectives 1) Job creation. 2) Water pollution abatement.	**Objectives** 1) Water pollution abatement. 2) Encouragement of "... comprehensive land management and residential development in previously undeveloped areas."	**Objectives** 1) Water pollution abatement. 2) Increased provincial and municipal control over specific development programs. 3) Inter-provincial equity. 4) Greater flexibility.
Eligible Projects Construction or expansion of: 1) Sewage treatment plants in new and existing areas; 2) Sanitary trunk collector sewers in both new and existing areas.	**Eligible Projects** Construction or expansion of: 1) Sewage treatment plans in new and existing areas; 2) Sanitary trunk collector sewers in new and existing areas; 3) Storm sewers in previously undeveloped areas; 4) Water supply in previously undeveloped areas; 5) Development of regional sewerage and water plans.	**Eligible Projects** 1) Sewage trunk lines and treatment in new and existing areas. 2) Community water supply facilities for new and existing areas (trucked, as well as piped, water supplies). 3) Trunk storm sewer systems (holding tanks and any treatment facilities required) in new and existing areas. 4) Sewer and water site services provided for residential land development conforming to specified density criteria. 5) Any other capital work in the federal-provincial operating agreements. (e.g. in Newfoundland and Nova Scotia- solid waste disposal; and in Manitoba, Saskatchewan, and British Columbia- waste from energy facilities.
Ineligible Projects Internal sanitary sewers; Storm trunk sewers; Repair and maintenance of existing sewerage systems; Water supply projects.	**Ineligible Projects** Internal sanitary sewers; Repair/maintenance of existing systems; Water and storm sewer projects within existing urban areas.	**Ineligible Projects** "Works not cited in federal, provincial operating agreements."
Funding Assistance Loans to municipalities covering two-thirds of the eligible capital cost of the projects at interest rates only 1/8% more than the borrowing rate of the Federal Government (usually 1-2% below market rate). Incentive grants equal to 25% of the loan amount would be forgiven under most conditions.	**Funding Assistance** Loans to municipalities covering two-thirds of the eligible cost of projects with 25% loan forgiveness as in STP. Grants equal to one-sixth of the project cost (if financing was obtained elsewhere). High cost grants (if project costs exceed $250 per capita) for communities of small size or on difficult terrain. Funds covering 50% of the cost for regional sewerage/water plans under most circumstances.	**Funding Assistance** Grants to provinces under agreements as federal contribution to provincially-approved municipal development in sewage and water infrastructure, as well as other community services.

Source: Bircham, Paul D. and Bond, Wayne K., 1984. The Impacts on Land Use of CMHC Municipal Infrastructure Assistance, 1961-1980. Environment Canada, Lands Directorate, Working Paper No. 32.

It is also clear that the funding process weakened the public's recognition of the federal contributions to municipal services.

12.3 Regional Economic Expansion

Federal funding of municipal sewage and water facilities has been contributed under the objective of regional economic growth through several programs. For example, between 1962 and 1969, the Atlantic Development Board provided financing for services in some 50 communities and provided the entire costs of water supply systems for fish processing plants and their dependent communities.

The Department of Regional Economic Expansion Act (DREE) initiated the federal government's first truly comprehensive commitment to regional development policy. Established in 1969, DREE absorbed a number of existing programs including the Fund for Rural Economic Development, the Agricultural and Rural Development Act and the Area Development Agency.

In 1974, General Development Agreements (GDA) were signed with all provinces but Prince Edward Island for which a long range comprehensive plan was already in place. Subsidiary Agreements under the GDA's have been used to obtain federal support for numerous infrastructure developments. Depending on the needs of each region, a variety of water and waste treatment facilities were constructed. Examples include a new water supply for metropolitan Halifax-Dartmouth, water and sewage facilities for smaller communities, such as Sudbury and North Bay, sewage facilities for urban centres like Regina and Montreal, and the servicing of industrial parks in a large number of communities across the country.

Industrial systems were also supported, including the upgrading of waste treatment systems of pulp and paper mills under agreements to assist the modernization of older plants. New or expanded water supplies were provided for fish processing plants in the Maritimes.

Unfortunately, a comprehensive listing of water and sewerage facilities contributed to by DREE is not readily available, but the contribution was significant, particularly in Atlantic Canada.

The expired GDA's are now being replaced by Economic and Regional Development Agreements under DRIE, the successor of DREE. The future inclusion of assistance for municipal infrastructure under these agreements is uncertain.

12.4 Prairie Communities

When DREE was formed in 1969 and regional development programs consolidated within it, the Prairie Farm Rehabilitation Administration (PFRA) maintained its identity and became DREE's principal arm for programs involving community water and sewage services in the three prairie provinces. PFRA had already been involved in the development of dams and dugouts for community water supplies, but new Agricultural Service Centres Agreements were signed in 1972. Under this program, the federal government contributed some $54 million for water and/or sewage services for about 50 communities with population over 2,000. The viability of these centres was considered essential to support agricultural growth in their localities. (Major urban centres of Winnipeg, Regina and Saskatoon and others in Alberta were not covered by this program.) Agreements expired with Alberta in 1979, Saskatchewan in 1983 and Manitoba in 1982. PFRA contributed

$28 million for 26 centres in Saskatchewan, $20 million for 15 communities in Manitoba, and $6 million for several towns in Alberta. The federal government's share of costs seems to have varied from about 70 percent in Manitoba to 90 percent in Saskatchewan.

Under 1979 Interim Subsidiary Agreements on Water Development for Regional Economic Expansion and Drought Proofing, water supplies were constructed for communities of fewer than 2,000 inhabitants. The agreements renewed community water supply programs that had been in effect for some time and covered work to be completed by March 31, 1983. Cost sharing was on a 50:50 basis with engineering design services supplied by PFRA and required lands provided by the provinces. Total federal costs for construction were $5.3 million in Saskatchewan and $2.725 million in Manitoba. Alberta did not enter into an agreement.

Late in 1984, Canada and Saskatchewan signed a new $32 million Subsidiary Agreement on Agricultural Community Water Infrastructure to renew community water development programs. A similar agreement is being discussed with Manitoba. Although now a part of Agriculture Canada, PFRA will be the federal agency implementing these agreements.

The scale of PFRA's involvement with community water supplies is impressive. In Saskatchewan, for example, about 900 community water supply projects have been completed. The number is much smaller in Manitoba where about 50 community water supplies have been built. Alberta has not expressed interest in cooperative programs for community services in recent years.

12.5 Comment

The major federal assistance programs for municipal sewerage and water systems have been offered through CMHC, DREE and PFRA. Objectives of federal involvement have included direct employment generation, pollution control, residential development, industrial development, agricultural support, and meeting treaty obligations. Behind all these objectives is undoubtedly a recognition of the inadequacy of municipal taxation powers to defray the costs of infrastructural needs.

Municipal infrastructure clearly falls within the ambit of provincial responsibility for local works and undertakings.

Whether or not the federal government should initiate new programs to support sewerage and water systems obviously involves issues much broader than federal water policies. In addition to fundamental questions regarding municipal financial capabilities, there are questions of equity among communities which deserve to be addressed. Are the costs of developing assured municipal water supplies for prairie communities so inordinately high as to merit special treatment? Has the diversification and growth of the southern prairies reached a level at which special assistance for municipal infrastructure should be questioned? On the other hand, should the highly successful programs of PFRA be extended to the typically small agricultural communities in the Peace River region, or central New Brunswick and elsewhere in Canada? Should similar communities dependent on the forest industry be included in an expanded program? These questions are well beyond the scope of water policy. They relate more to ability to pay, equity, regional development policies and federal-provincial relations.

If there is to be federal assistance, it would seem to make sense to have but one program under which municipal water and sewage facilities might be eligible to receive assistance. In the past, some projects, such as the Montreal sewage facilities, have received assistance from more than one program. In other cases, like Halifax, major assistance has been provided to provide new water systems where no sewage treatment facilities existed even though the needs had been identified. Federal sharing of costs has varied from a low of about 17 percent under CMHC programs to 100 percent under some PFRA and Atlantic Development Board programs. While the range of assistance levels may well be justified on various grounds, the availability of a variety of programs tends to create competition among programs and "fishing trips" by those seeking assistance. A single national program with a single set of eligibility criteria would help ensure equal treatment across the country or within a province.

> IT IS RECOMMENDED that the federal government review its past and current policies of financial support for municipal water and sewage facilities and develop a single program with a comprehensive set of objectives and eligibility criteria for use on a nationwide basis.

13. TOXIC CHEMICALS

13. TOXIC CHEMICALS

13.1 Introduction

Concern has been growing over toxic substances in the environment both on a worldwide basis as focussed upon by the OECD and domestically as dramatized by the discovery of mercury in water downstream of pulp mills and chlor-alkali plants, and arsenic in water supplies near gold mine areas, and mirex, dioxins and other toxic chemicals in the Great Lakes. The greatest focus of public and governmental interest has been the lower Great Lakes that serve as the water supply for some six million people, including 4 million Canadians. With respect to the Great Lakes, Canada joined with the United States in 1978 in adopting a policy to prohibit the discharge of toxic substances in toxic amounts and to virtually eliminate the discharge of any or all persistent toxic substances.

Environment Canada defines toxic chemicals as

> "those substances which, when released to the environment, or thereafter if chemically transformed through combination or otherwise, could pose a significant threat to natural ecosystems or to human health and well-being."[1]

The Revised Canada-United States Great Lakes Water Quality Agreement (1978) definition of a toxic substance is one

> "which can cause death, disease, behavioural abnormalities, cancer, genetic mutations, physiological or reproductive malfunctions or physical deformities in any organism or

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[1] Environment Canada, 1980. Toxic Chemicals Management Program.

> its offspring, or which can become poisonous after concentration in the food chain or in combination with other substances."

There are some 65,000 chemicals produced commercially worldwide, only a small proportion of which have been subjected to exhaustive toxicological screening. Some 200 to 1,000 new chemicals enter world markets each year and the costs of testing one can be in the order of $1.5 million. The task appears immense.

Unlike the majority of programs discussed to this point, toxic chemicals management is not a discrete problem that can be dealt with effectively by a single agency of government. The topic is simply too broad, the impacts too diverse and the management options too variable. The key to dealing successfully with toxic substances in the environment is to subdivide the subject into component issues, each large enough to attract attention but small enough to be susceptible to solution. Major responsibility for dealing with each issue should then be assigned to a single agency with authority to draw on the skills of others as required.

On reviewing its roles with respect to toxic substances in general, the Government found that some 58 Acts were involved, administered by 24 departments, with programs coordinated by at least 80 mechanisms. At the same time, an overall guiding policy was found lacking. Four key departments were identified: Environment, National Health and Welfare, Fisheries and Oceans, and Agriculture. The four developed terms of reference for a formal Interdepartmental Committee on Toxic Chemicals, proposals for the collective interdepartmental tackling of problems, and a policy framework to guide federal departments involved in the management of toxic chemicals.

In January 1984, the Government approved the formation of the Interdepartmental Committee on Toxic Chemicals (ICTC) for an interim three year period. The Committee was instructed to prepare and recommend federal action plans on five priority issues: dioxins, drinking water safety, pesticides, contaminants in fish, and indoor air quality. Four of the five issues are directly related to water management.

13.2 Interdepartmental Committee on Toxic Chemicals

13.2.1 Purpose

The role of the ICTC is to identify major issues arising in the toxic chemicals areas, develop overall policy and a coordinated approach to managing toxic chemical activities in respect to the federal government as a whole, and provide authoritative advice to Ministers on major policy and resource allocation questions.

The ICTC does not usurp the line authority of departments; nor does it preclude existing procedures whereby departments work with central agencies, such as the Treasury Board.

13.2.2 Membership

Membership of the ICTC includes senior officials from 11 departments: Environment (Chair) National Health and Welfare Agriculture Fisheries and Oceans Transport Indian Affairs and Northern Development National Research Council Consumers and Corporate Affairs Regional Industrial Expansion Labour and External Affairs. Observer status is provided for several central agencies including Treasury Board and the Privy Council Office.

13.2.3 Policy Objective

The objective developed by the ICTC and adopted by the Government is:

> "To manage chemicals in Canada in a manner that permits enjoyment of the economic and social benefits that accrue from their production, trade and use while achieving and maintaining a condition of the environment necessary for the health and well-being of human beings, protection and conservation of natural resources and the health and diversity of species and ecosystems, now and in the future."

This objective implies that:

(a) the chemical industry would contribute to the economy;

(b) chemicals would be available to contribute to productivity in manufacturing, agriculture, forestry, mineral and other resource sectors; and,

(c) chemicals would be available to contribute to human and animal health and well-being,

while:

(a) permitting environmental quality goals to be achieved through remedy of adverse impacts of chemicals now in the environment;

(b) preventing future problems from arising in the production, distribution, use and disposal of chemicals; and

(c) ensuring health and safety of people.

13.2.4 ICTC Strategy

(a) Risk Assessment

Canada is a party to the 1981 OECD decision on the mutual acceptance of data in the assessment of chemicals and subscribes to a 1974 OECD recommendation that prior to marketing of chemicals and chemical products, their potential effects on man and his environment be assessed. To ensure consistency in testing requirements of federal agencies and that they meet international obligations, the ICTC will review procedures used by departments to identify and estimate hazards.

(b) Risk Management

Risk management involves balancing various social and economic benefits against health and environmental risks to predict the consequences of alternative actions and to select the optimum strategy.

The ICTC will develop and implement procedures for determining which federal statutory authority would be most appropriate to use in response to a given problem.

The ICTC will also review various alternative and supplementary approaches to direct regulation and examine their effectiveness under different circumstances.

(c) Compliance and Enforcement

The ICTC will review federal agency inspection activities to improve coordination of monitoring and regional laboratory services.

(d) Priorities for Action

The ICTC is charged with the identification of special issues that merit priority for interdepartmental collaboration. For those issues, the Committee will develop coordinated action plans that address the resource requirements of the agencies involved.

(e) Research

The ICTC coordinates research for the three-year action plans on special issues and promotes research and development of clear technologies for chemical production, recycling and recovery processes.

13.2.5 Principal Roles of Main Agencies

DOE - monitoring the aquatic environment for presence levels and effects of toxic substances.

characteristics research on toxic substance pathways, transformations, chemical characteristics, bioaccumulation, toxicity to biota, eventual environmental fate, damage to aquatic communities.

inventory of potential sources of toxic substance release into the environment incorporating an analysis of the commercial life cycle of types and quantities of toxic chemicals including waste residuals released or with a potential of release to the environment.

assessment of potential effects of toxic substances on environmental health, and priority-setting for action.

control information and warnings to public, provinces and industry, identification of remedial measures, identification of substitutes, regulation of waste management under Section 33 of the Fisheries Act, regulation under Environmental Contaminants Act.

advice (a) to Agriculture on pesticides registration
- (b) to Transport on transportation of dangerous goods
- (c) to AECB on environmental implications of waste management in nuclear industry
- (d) to National Health and Welfare on newly identified toxic substances
- (e) to Indian Affairs and Northern Development on waste management requirements for inclusion in water use licences
- (f) to External Affairs and IJC concerning Boundary Waters Treaty obligations and Canada-U.S. Agreement on the Great Lakes, and others.

NHW - characteristics research on toxicity to humans, bioaccumulation, and health criteria

assessment of potential impacts on humans

control through drinking water quality guidelines

advice (a) to Agriculture on pesticides registration
- (b) to Environment on toxicity and other environmental contaminants
- (c) to Fisheries and Oceans on edibility significance of contaminants in fish
- (d) to Environment on Great Lakes Water Quality
- (e) to Transport on transportation of dangerous goods.

DOA - assessment of efficacy and risks of pesticides with respect to agricultural productivity and product marketing.

control of pesticides through registration under the Pest Control Products Act, including formulations, acceptable levels of contaminants, use categories, application methods.

DFO - monitoring of toxic substances in commercial and sports fish, food chains and habitat.

characteristics research on exposure, bioaccumulation and effects of substances on fish.

assessment of fish edibility, marketing risks, fisheries productivity.

control measures through industrial waste disposal requirements under the Fisheries Act.

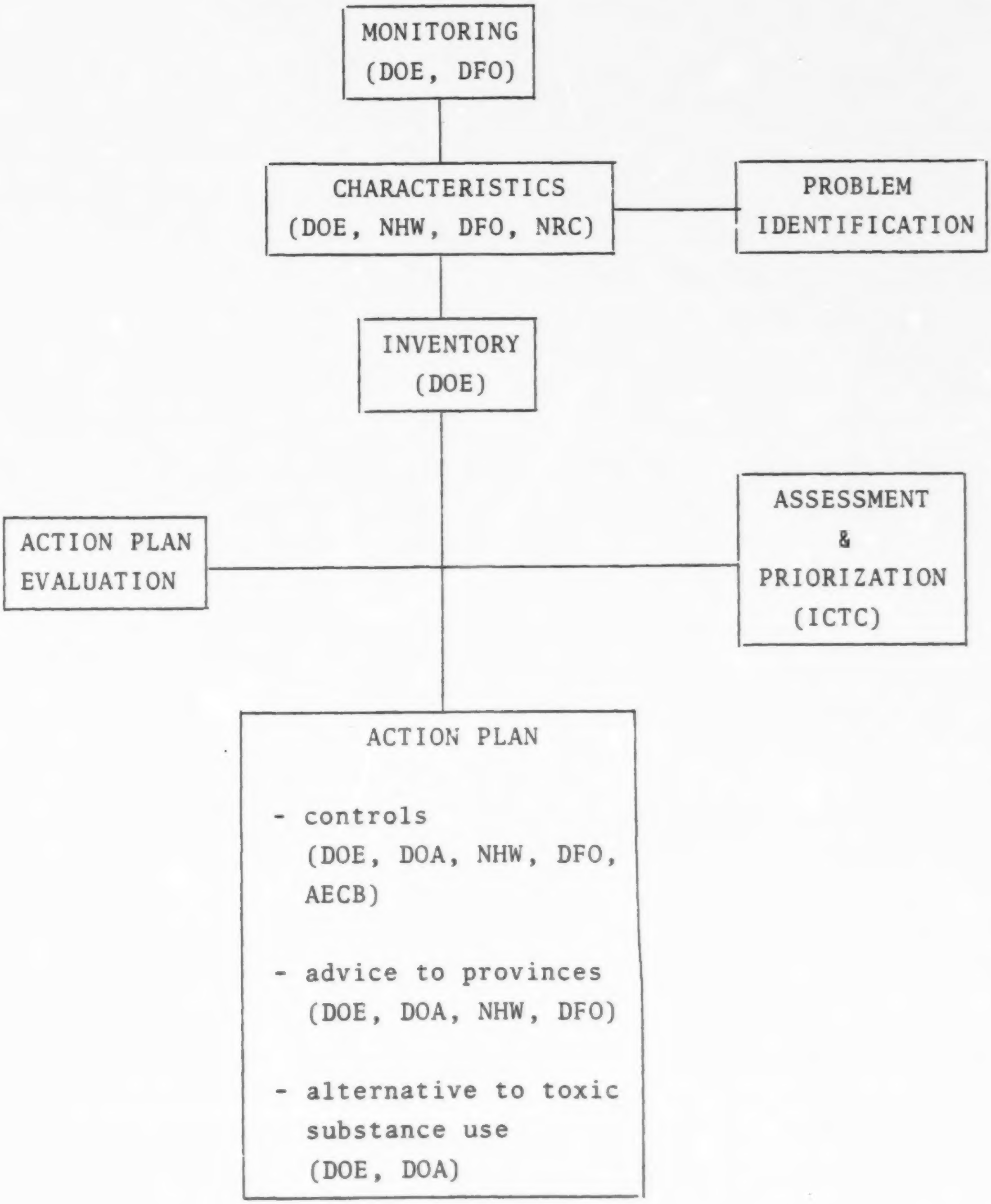
advice (a) to Environment on industrial and municipal waste treatment requirements for implementation under Fisheries Act
(b) to Agriculture on registration of pesticides
(c) to Environment on implications of toxic substance contamination on the health and marketability of fish.

DOT - control through regulations under the Transport of Dangerous Goods Act.

DIAND - monitoring and surveillance of industrial waste management in the North.

control through waste management requirements contained in water use licences in the North.

TOXIC CHEMICALS MANAGEMENT


MONITORING
(DOE, DFO)
CHARACTERISTICS
(DOE, NHW, DFO, NRC)
PROBLEM IDENTIFICATION
INVENTORY
(DOE)
ACTION PLAN EVALUATION
ASSESSMENT & PRIORIZATION
(ICTC)
ACTION PLAN
- controls
(DOE, DOA, NHW, DFO, AECB)
- advice to provinces
(DOE, DOA, NHW, DFO)
- alternative to toxic substance use
(DOE, DOA)

13.3 Toxic Chemicals Action Plans

The first task assigned to the ICTC has been to develop three-year action plans for five priority issues: drinking water safety; dioxins; pesticides; contaminants of fish; and, indoor air quality. Leadership roles have been assigned, collaborating departments identified, issues defined, and proposed strategies outlined. Comprehensive strategies are being developed.

These issues are not mutually exclusive. Pesticide management practices, for example, affects the presence of dioxins in pesticides as well as the distribution of pesticidal components in the environment, including raw drinking water supplies and fish habitat.

Management by issues crosses lines of responsibility both among departments and within individual departments. The latter is particularly true for Environment.

13.3.1 Drinking Water Safety

(a) Issue

There has been a recent increase of awareness of chemical contamination of drinking water supplies focussed around leakage from U.S. toxic waste dumps in the Niagara region, pesticide infiltration into ground water and runoff into surface water supplies, and localized arsenic and contamination in mining areas.

Rapid advances in analytical methods has led to detection of trace concentrations of more than 2,000 chemicals not previously detected in watercourses. Many of these are known to be toxic, mutagenic, carcinogenic or teratinogenic.

The efficacy of water treatment technologies in removing many of these chemicals is unknown.

Chemicals used to treat raw water supplies are not subject to any regulatory quality controls.

Point-of-use, or household treatment devices are not adequately regulated.

Canada has no drinking water standards, only guidelines for some 52 parameters, only half of which are routinely monitored by provincial authorities.

The provinces jealously protect their jurisdiction over drinking water quality as a health issue, a matter of local concern.

General authority for federal involvement is found in the criminal and peace, order and good government constitutional powers. Section 5 of the Department of National Health and Welfare Act provides that the powers of the Minister extend to and include all matters relating to the promotion and preservation of health of Canadians. The Food and Drug Act provides for the regulation of health implications of food and drugs sold in Canada. By definition under that Act, water is a food. The Act was written with packaged goods in mind, however, and some of its provisions, such as those for search and entry or seizure of products, are not appropriate for application to community water supplies.

Technically, the question of regulating the quality of drinking water is not a water resource management issue. Rather, it is an issue relating to the quality control of a water product after it has been withdrawn from nature and before it is sold or delivered for consumption. For practical purposes, however, it is a resource management matter as well, since some contaminants of raw water are not readily susceptible to removal.

(b) Objective

The objective of the federal drinking water safety program is to promote the protection of natural water quality and the appropriate treatment of drinking water supplies.

(c) Strategy

The detailed strategy being prepared by National Health and Welfare will incorporate the following elements:

(a) protection of raw water quality through guidelines for pollution control (DOE);

(b) assessing suitability of water bodies for drinking water (DOE);

(c) joint federal/provincial water quality improvement (DOE);

(d) toxicity research (including carcinogenicity) of chemical water contaminants, especially organics (NHW);

(e) epidemiological studies in areas of known contamination (NHW);

(f) surveys of drinking water for contaminants (NHW);

(g) provision of a national reference service for drinking water contaminants (NHW);

(h) provision of analytic services for some unequipped provinces (NHW, DOE);

(i) review of conventional water treatment technologies for removing chemical contaminants (NHW);

(j) development of new treatment technologies (NHW);

(k) research into alternatives to chlorination for disinfection to avoid production of carcinogenetic substances (NHW);

(l) investigation of suitability of point-of-use water purifiers (NHW);

(m) legislative proposals to control drinking water treatment chemicals (NHW);

(n) revision and expansion of "Guidelines for Canadian Drinking Water" (1978), (NHW);

(o) legislative alternatives for drinking water standards for the federal domaine (NHW);

(d) Comment

Interestingly, the federal government has the authority to regulate the "drinking" water of fish and migratory birds. It even regulates the drinking water quality of migrating people while aboard a common carrier, but not once one has arrived at a destination. Strange quirks of constitutional fate.

If there are certain levels of carcinogenicity, mutagenicity, or other category of toxicity at which the federal government is moved to act to protect Canadians from ingesting contaminated foods and drugs, the same should apply to drinking water, whether drawn from a bottle or a tap. It is arguable that those substances that are highly toxic, disperse readily in the environment, are persistent and accumulate in the tissues of biota (including humans) are of urgent national concern, and as such are subjected to federal regulation.

In 1974, the United States passed a Safe Drinking Water Act allowing the setting of federal standards and recognizing the authority of states to enforce them. Provisions were also contained to undertake action should states fail to enforce federal standards. Provision is also made to require that the public is informed if federal standards are not met.

> IT IS RECOMMENDED that National Health and Welfare, in consultation with the provinces, establish definitions for matters of urgent national concern respecting toxic chemicals in drinking water and the treatment thereof.
>
> IT IS FURTHER RECOMMENDED that the federal government enact a Safe Drinking Water Act to authorize the regulation of contaminants of urgent national concern; regulation of chemicals used for water treatment; and, regulation of sale of household water treatment systems.

Many of the strategies listed above are already on-going. The detailed strategy will effect their coordination and augmentation.

The figures listed below for the lead department indicate that there has been no change in manpower allocated to the drinking water program of National Health and Welfare over the last five years. While financial resources increased quite sharply, in current dollar terms, between 1980-81 and 1983-84, they fell by 26% in 1984-85 to return to the levels of 1982-83.

APPROXIMATE RESOURCES*
ENVIRONMENTAL HEALTH DIRECTORATE
NATIONAL HEALTH AND WELFARE

$000's and (p/y)

	80-81	81-82	82-83	83-84	84-85
Drinking water	491(10.3)	458(5.7)	723(8.7)	1007(11.6)	752(10.2)
Acid rain effects	22(0.1)	38(0.2)	44(0.5)	51(2.0)	27(0.5)

*Data courtesy of NHW.

While these figures may appear to be surprisingly low, it must be borne in mind that progress on drinking water requirements is closely supported by activities in other budgetary divisions of National Health and Welfare, pesticide product review and environmental contaminants, for example. The Department's 1984-85 budget provides for $1.1 million and 29 person-years work on pesticides and $2.6 million and 31.5 person-years dedicated to environmental contaminants.

First estimates suggested that the current resource allocation to National Health and Welfare for drinking water programs will need to be augmented from the current level of 10 person-years and $800,000 annually to 37 person-years and $6.4 million annually. About 4 person-years and $250,000 additional resources will be required by Environment Canada.

13.3.2 Dioxins

Coordinating Department: Environment
Collaborators: National Health and Welfare, Agriculture, Fisheries and Oceans, National Research Council.

(a) Issue

Dioxins are a group of 75 chemicals produced adventitiously with the manufacture of certain chemical products, particularly pesticides, and as a by-product of combustion.

Only two dioxins have been tested comprehensively and both have been found to be carcinogens at very low exposure levels. While most dioxins are not thought to be particularly toxic, assurance is required since they are known to be very persistent and their detection in humans and wildlife raises considerable concern.

The most toxic dioxin known, 2,3,7,8-TCDD, was found to be present in widely used herbicide 2,4,5-T. Improvements in manufacturing processes have reduced contamination to acceptable levels.

A monitoring program of herring gull eggs in the lower Great Lakes area first detected the presence of dioxins in the Lakes. The major source has been identified as industrial waste dumps of chemical plants in the United States, particularly in the Niagara River area.

(b) Objective

The objective of the Canadian dioxin program is to take immediate control action of major known sources of dioxins to minimize their entry into the environment.

(c) Strategy

The basic strategy is to identify dioxin pathways into the environment, determine effective means of preventing entry, and take the indicated preventative action.

The strategy includes a decision to put low priority on further refinements in risk assessment of individual dioxins. This decision was taken in consideration of the urgency involved and the knowledge that the assessment of the most toxic dioxin, 2,3,7,8-TCDD, involved 10 years of intensive worldwide research at a cost of some $100 million.

A major element of the strategy has been to identify sources of dioxin entry into the lower Great Lakes system and to urge the United States to require a clean-up of chemical industry waste sites leaking dioxins and other toxic substances into the environment.

An interdepartmental strategy to control dioxins within Canada was announced in December, 1983.[1] It has two major components.

The first is to control the life cycle of dioxin-containing substances, including industrial waste disposal practices. The second is to assess the potential for dioxin formation from various combustion sources.

The action plan identifies the potential pathways into the environment for each of the seven known dioxin-containing chemicals that have been used in Canada and outlines steps being taken to reduce potential problems. Stages of the life-cycle being scrutinized are registration, manufacture, formulation, transportation, storage, use and disposal. Major means of control are the Pest Control Products Act, Food and Drug Act, Transportation of Dangerous Goods Act, and the Environmental Contaminants Act. While not specifically water management acts, their successful implementation can regulate most avenues of dioxin entrance into the environment.

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[1] Canada, 1983. Dioxins in Canada: The Federal Approach. Interdepartmental Committee on Toxic Chemicals, Environment Canada.

Registration of pesticides under the Pest Control Products Act provides for the regulation of product formulations and categories of uses permitted, such as aerial or ground application and agricultural or forestry uses. The Act is administered by Agriculture Canada with advice from Environment, National Health and Welfare, and Fisheries and Oceans. Maximum dioxin levels have been prescribed for 2,4-D and 2,4,5-T and are being investigated for tetrachlorophenol and pentachlorophenol, two wood preservatives. Registration of triclosan for limited pesticide use is being re-examined.

National Health and Welfare administers the Food and Drug Act under which the dioxin levels and use of hexachlorophene and triclosan in health care products are controlled.

All known dioxin-containing products are listed under the Transportation of Dangerous Goods Act administered by the Department of Transport. The Act provides for reasonable safety standards for packaging, handling and transporting goods, and in the case of waste products, to ensure that the correct type and quantity reaches intended destination.

The action plan calls for use of the Environmental Contaminants Act to collect information from industry to learn of possible past manufacturing of dioxin-containing chemicals and to monitor use patterns so that an inventory of possible trouble-spots may be maintained.

The historical deep-well injection disposal at pesticide manufacturing plants is being re-examined by the three provinces involved (Alberta, Saskatchewan and Manitoba). Environment Canada is investigating high temperature incineration as an alternative to deep-well disposal.

A federal-provincial abandoned waste site program is underway to determine the extent to which toxic chemicals may be creating problems. Some 4,500 sites are being assessed to determine where remedial action may be required.

Monitoring programs include analyses of commercial fish by National Health and Welfare in cooperation with Fisheries and Oceans. The latter will also monitor for dioxin contamination in other aquatic biota to determine trends.

Environment Canada, through the Canadian Wildlife Service, has been using birds eggs to monitor for contaminants including dioxins. A herring gull egg monitoring program first identified the presence of mirex and dioxins in the Great Lakes and has been used to monitor the long-term effects of control programs.

Other monitoring programs include detailed investigations of dioxins in known or suspected areas including the Niagara, Detroit and St. Clair rivers. Water and sediment analyses are conducted by the Inland Waters Directorate of Environment Canada.

In light of a vast international research effort on dioxins the Canadian action plan is limited. The current program exceeds $1 million. The objective of one project is to define the chemical properties of the higher chlorinated dioxins that determine the bioaccumulation and persistence potentials of these compounds. Another is to test the rather simple enzyme tests used to predict toxicity of dioxins. A carcinogenic study of a predicted inactive dioxin will be carried out.

(d) Comment

Initiatives available to the federal government are weakest in the waste management sphere. Both industrial and general waste disposal regulations are the responsibilities of provincial governments. While the Fisheries Act may be applicable in some instances, this would occur only after a landfill site had become defective with leakage of toxic chemicals into the ground water and thence to fish habitat.

The federal action plan provides for development of codes of good practice for waste disposal and the encouragement of their adoption by industry and by the provinces that regulate waste management.

The very nature of dioxin-containing substances dictates that control emphasis be placed on preventing them from entering the environment in the first place. Some are highly toxic. They persist for long periods. They accumulate in the tissues of biota, including man. When they enter water they dissolve, disperse and are to all intents and purposes impossible to remove through water treatment.

The federal action plan is on the right course in emphasizing viligant implementation of the Pest Control Products Act, Food and Drug Act and the Environmental Contaminants Act. As has already been recommended, however, the latter requires strengthening to place the onus on the chemical industry to prove dioxin-free nature of its products before they are imported, manufactured or used in Canada. But even further strengthening is required. Not only should chemical products be dioxin-free, or be within approved limits, the waste products of their manufacturing must also be dioxin-free before disposal into the environment. The regulation of waste disposal of highly toxic substances would require additional amendments to that Act.

> IT IS RECOMMENDED that the authority of the Ministers of Environment and National Health and Welfare under the Environmental Contaminants Act be extended to provide for the control of manufacturing or processing of substances, when the waste products of such operations contain dioxins or other persistent toxic, bioaccumulative substances in quantities or concentrations exceeding prescribed levels.

13.3.3 Pesticides

Coordinating Department:	Agriculture
Collaborators:	Environment, National Health and Welfare, Fisheries and Oceans

(a) Issue

The insecticidal properties of DDT were not recognized until 1939. Used during World War II to control disease-carrying lice, it was not introduced commercially until 1945. Since that time, agricultural and forest management practices have intensified dramatically with a concommitant increase in use of insecticides and herbicides.

In recent years, the Canadian pesticides registration process has been placed under considerable stress resulting from several factors, among which have been:

(a) a growing number of new pesticides proposed for registration by the chemicals industry;

(b) the discovery in 1977 that one of the major pesticides testing laboratories in the US had been producing unreliable data, requiring the re-evaluation of many pesticide registrations;

(c) a need to re-evaluate widely used pesticides registered when testing methods and standards were less sophisticated than today, plus a need for still more informative testing programs.

(d) a request by Canadian forestry ministers for priority attention to 15 pesticides required to meet urgent forest renewable programs. In 1982, only the 2,4-D and

2,4,5-T herbicides were registered for forestry use and several provinces did not permit the use of 2,4,5-T;

(e) advances in analytical techniques making it possible to detect the presence of very small amounts of pesticides in the environment, in concentrations of unknown biological significance; and,

(f) pressures from interest groups seeking the banning of pesticide use, or more stringest controls; plus pressure from producers and users for a better registration system.

(b) Objective

The objective of the pesticides registration process is to regulate the manufacture, sale, storage, display, export and use of pest control products to ensure safety to human health from exposure to pesticides and their residues in foods, protection of the environment, and pesticide efficacy against identified pests.

(c) Strategy

Agriculture Canada administers the Pest Control Products Act with the advice of National Health and Welfare, Environment and Fisheries and Oceans.

In consultation with its advisor departments, Agriculture specifies the data packages of scientific information required of manufacturers when applying for registration of pesticides.

Agriculture and Forestry review the submitted efficacy data against specific pests and carry out field trials of their own. The two agencies also assess pesticide residue, fate, soil persistence and leaching characteristics.

National Health and Welfare assesses the toxicological implications for humans of each new pesticide, establishes the safety measures for those who handle the products or may otherwise be exposed to it, and determines residue limits for foods.

The Fisheries and Oceans review concentrates on fish habitat protection. The physio-chemical properties of the active ingredients and formulations are assessed with particular attention being given to rates of degradation and the products thereof, persistence and fate in water, risk of fish exposure, bioaccumulation, and the accute and sublethal responses of fish and other aquatic organisms.

The review processes of Environment Canada are designed to ensure that the environmental safety of proposed pesticides has been adequately demonstrated. The aquatic oriented review is designed to identify and quantify the likelihood of contamination of aquatic systems, including ground water and waterfowl habitat. The biological availability and toxicological significance of these exposure situations to migratory birds and other wildlife are assessed. Persistence of pesticides and their degradation products, their mobility, their potential for bioaccummulation, and their potential to disrupt ecosystems are examined. Environment Canada also recommends requirements for safe disposal of pesticide containers and leftover product.

The information available on resources assigned to the pesticides registration review process by advisor departments is shown in Table 13.1. The recent substantial increases assigned to National Health and Welfare and Environment were in response to pressures to reduce the backlog of new pesticide applications and the re-evaluations required where original data submissions were found to be suspect. The percentage of these resources directly related to the aquatic implications of pesticides cannot be segregated.

Table 13.1

RESOURCES
Pesticide Registration Review
Advisory Departments

	80-81		81-82		82-83		83-84		84-85	
	P-Y	$000	P-Y	$000	P-Y	$000	P-Y	$000	P-Y	$000
NHW	8.7	435	8.1	448	11.5	647	17.0	990	28.8	1,132
DFO	1.0		1.0		1.0		1.0		1.0	50**
EPS[1]	1.0		1.0		1.0		2.0		8.0*	429
CWS[2]	1.0		1.0		1.0		1.0		1.0	50**

* Two not staffed
** Estimated

[1] Environmental Protection Service, DOE

[2] Canadian Wildlife Service, DOE

The review processes are supported indirectly by research programs to monitor environmental pathways, fates, and bioaccumulations in fish and aquatic birds. The Environmental Protection Service of Environment Canada (EPS), for example, has a limited program to identify and assess pesticide use patterns, to monitor ground water contamination in Prince Edward Island, to analyze the levels of pesticide runoff in water and fish in selected rural watersheds, and to assess the bahaviour of pesticide residues in watercourses. Resources allocated to these projects amounts to but 3.5 person-years and some $333,000 per year. The EPS also works with provincial regulatory agencies advising on major spray programs, assisting in "safe use" seminars with applicators and advising on disposal methods for used pesticide containers.

Fisheries and Oceans test for some pesticide residue accumulating in fish as a part of their toxic chemicals monitoring program.

The Canadian Wildlife Service monitors for selected pesticides as part of its study of toxic substances accumulating in the eggs of fish eating gulls in the Great Lakes.

Agriculture Canada is now developing a revised pesticides management plan with the collaboration of National Health and Welfare, Environment, and Fisheries and Oceans.

The action plan is expected to provide for a better coordinated and more efficient pesticides review process through:

(a) establishment of clearer guidelines to industry on the scientific data requirements for product registration;

(b) preparation of evaluation guidelines to improve consistency and impartial decisions in the review process;

(c) a priority-rating system for selecting products in use for re-evaluation;

(d) increased emphasis on determining the significance of trace amounts of pesticide residues in the environment;

(e) expanded programs to monitor use and effects of pesticides;

(f) new programs to inform the public of methods and criteria used in the pesticides evaluation process, including the risk/benefit analyses employed in the risk management process and the inherent uncertainties related to some decisions;

(g) a new approach to obtain public contributions to pest control product regulatory decisions; and,

(h) accelerated promotion and development of alternatives to chemical pesticides.

(d) Comment

Level of Effort

Canada is recognized as having one of the most stringent pesticide registration review procedures in the world. A number of countries rely on Canada's decisions respecting specific products before making their own decisions concerning use in their countries. Yet until very recently, the resources available to Agriculture's advisor departments has been seriously inadequate, resulting in a large backlog in the review process for both new products and the re-evaluation of older registered pesticides. While National Health and Welfare has received what it considers to be an adequate increase in manpower allocation, rising from 11.5 to 28.8 person-years since 1982-83, the other advisor departments' capabilities remain woefully weak and will require augmentation when the new three-year action plan is reviewed for approval.

It is important that both Environment and Fisheries and Oceans obtain adequate resources needed for responsible contribution to the registration process. At the same time, in recognition of the general scarcity of funds available to the Government, it is essential that there be no duplication of effort. In this regard, it appears that the aquatic assessment of pesticides by the Environmental Protection Service of Environment closely parallels that of Fisheries and Oceans. The two programs need review to ensure their mutual support.

> IT IS RECOMMENDED that high priority be assigned to augmenting the resources assigned to carefully coordinated pesticide registration programs of Agriculture, Environment and Fisheries and Oceans.

Placing the emphasis on the pesticide registration process is justifiable both from the problem prevention standpoint and because, once placed on the market, pesticide use is difficult to regulate. It is incumbent on those responsible for product registration to monitor the pathways, fates and effects of pesticides in the environment both to test the predictions on which registration decisions were based and to assess the adequacy of the use regulation system. As previously noted, there does not appear to be a cohesive program of monitoring, and in this regard the potential contribution of the new water quality monitoring network of Environment's Inland Waters Directorate should not be overlooked.

> IT IS RECOMMENDED that the revision of the pesticides management plan being prepared by Agriculture Canada place emphasis on developing a comprehensive program to monitor the pathways,

> fates and effects of registered pesticides to test pre-registration assumptions and assess the adequacy of compliance with registration provisions.

Responsibility Centres

The historic shortage of resources dedicated to the pesticide management process may be a result, in part at least, of the absence of a clearly legislated mandate for the ministers of National Health and Welfare, Environment, and Fisheries and Oceans to contribute to decisions under the Pest Control Products Act. Some critics go so far as to recommend that responsibility for the Act should be assigned to a minister who is not a proponent of increasing agricultural productivity and consequently a proponent of pesticide use.

On the other hand, it is clear that the pesticide review process involves the weighing of both risks and benefits, and all the departments involved have their particular biases. The three advisor departments all have strong "safety" biases. Agriculture has its productivity bias, but it also has a safety bias with respect to the marketability of residue-free farm products, the protection of pollinators and natural predators of farm pests and the protection of farm water supply quality, On balance, Agriculture seems to be the reasonable choice as decision-maker, but with one proviso -- the Pest Control Products Act should be amended to recognize formally the practice of basing decisions on the advice of the advisory departments.

> IT IS RECOMMENDED that the Pest Control Products Act be amended to provide for product registration based on advice from the Ministers of National Health and Welfare, Environment, and Fisheries and Oceans.

14. LONG RANGE TRANSPORT OF ATMOSPHERIC POLLUTANTS (LRTAP)

14. LONG RANGE TRANSPORT OF ATMOSPHERIC POLLUTANTS (LRTAP)

14.1 Issue

A decade ago, water quality management meant treatment of municipal and industrial liquid wastes and the regulation of some farm practices to reduce pollution from surface drainage. Little, if any, thought was given to the atmosphere as a source of water pollution. The significance of long range transport of airborne pollutants (LRTAP), or acid rain, only began to come into focus in Canada in the mid 70's with the identification of toxic substances in the Great Lakes and the loss of fish productivity in Scandanavian lakes. The source of the latter problem was traced to sulphur dioxide emissions in the industrialized areas of Great Britain and western Europe.

These findings stimulated research interests in eastern Canada where early studies found evidence of surprisingly acidic rainfalls and spring snow melts, a tentative relationship between increasing water acidity and reduced salmon productivity in several Nova Scotian rivers, and suspicions of reduced forest growth.

More recent research indicated that there are more than 260 million hectares of eastern Canada including thousands of lakes that are susceptible to acid rain damage. These areas have naturally acidic soils with low buffering capability. Signs of stress have been found in many lakes surveyed in Ontario and Québec. At least ten once important salmon rivers in Atlantic Canada no longer support salmon runs; others are under stress.

The problem is compounded by the ability of acid rain to leach toxic metals from soils and exposed bedrock, increasing their concentrations in watercourses. Mercury, cadmium, zinc, aluminum, arsenic, and others are involved. These may accumulate in the tissues of fish, waterfowl, and water-frequenting mammals, reducing population levels. Contamination levels in fish may also render them dangerous to eat. Heavy metals concentrations in waters used as drinking water sources can also pose human health problems.

The LRTAP issue is not restricted to acid rain that is related to the gaseous emissions of thermal electric plants, the smelting industry and transportation systems. A variety of other dangerous substances reach our watercourses through airborne pathways. It has been estimated, for example, that one tonne of polychlorinated biphenols (PCB's) annually enter Lake Ontario from airborne sources. The pesticide toxaphene has been found in trace amounts in Lake Superior, many hundreds of miles from where it is used.

14.2 Objective

The objective of the LRTAP program as defined by Environment Canada, is to reduce acidic deposition to a level that will protect the health and well-being of man, the health and diversity of species and ecosystems and the sustained use of natural resources for social and economic benefit. The objectives of the aquatic component are to relate airborne emissions to water quality and to determine the effects on aquatic life, water-frequenting birds and animals and human health.

More specifically, sub-objectives directly related to water management and to support the negotiation of control measures with the United States are:

(a) to monitor spatial and temporal trends in water chemistry in relation to atmospheric loading (DOE - IWD);

(b) to quantify pathways and define cause-effect relationships (DOE - IWD);

(c) to assess effects of acidification on the habitat and food of selected wildlife species (DOE - CWS);

(d) to assess the effects of acidification on changes in concentration of some toxic substances in the environment and their effects on wildlife (DOE - CWS);

(e) to develop scientific documentation on the effects of acid rain on fisheries (DFO);

(f) to assess the economic and social costs associated with the deterioration of the fishery resource (DFO);

(g) to preserve genetically valuable fish stocks over the interim period while awaiting effective emission control measures (DFO);

(h) to assess the risks to health posed by airborne pollutants and monitor the influence of abatement programs (NHW);

(i) to negotiate federal-provincial agreements to reduce domestic emissions (DOE); and,

(j) to negotiate Canada-U.S. agreements to reduce emissions (DOE, EA).

14.3 Strategies

Since more than half the acidic pollutants falling in Canada have been traced to U.S. sources, solution to the problem involves two major thrusts -- reducing Canadian emissions and convincing the Americans to take similar action. The domestic control action is required both in its own right and as a firm demonstration to the U.S. that Canada is serious about the issue and intends to see it solved.

The present U.S. Government has been reluctant to initiate expensive emission control programs. The excuse has been that insufficient evidence has been amassed to demonstrate clear cause and effect relationships between sulphur dioxide emissions and environmental damages. The Canadian strategy must, therefore, include continuance of sophisticated monitoring and research programs to add to the evidence already accumulated, including attention to oxides of nitrogen.

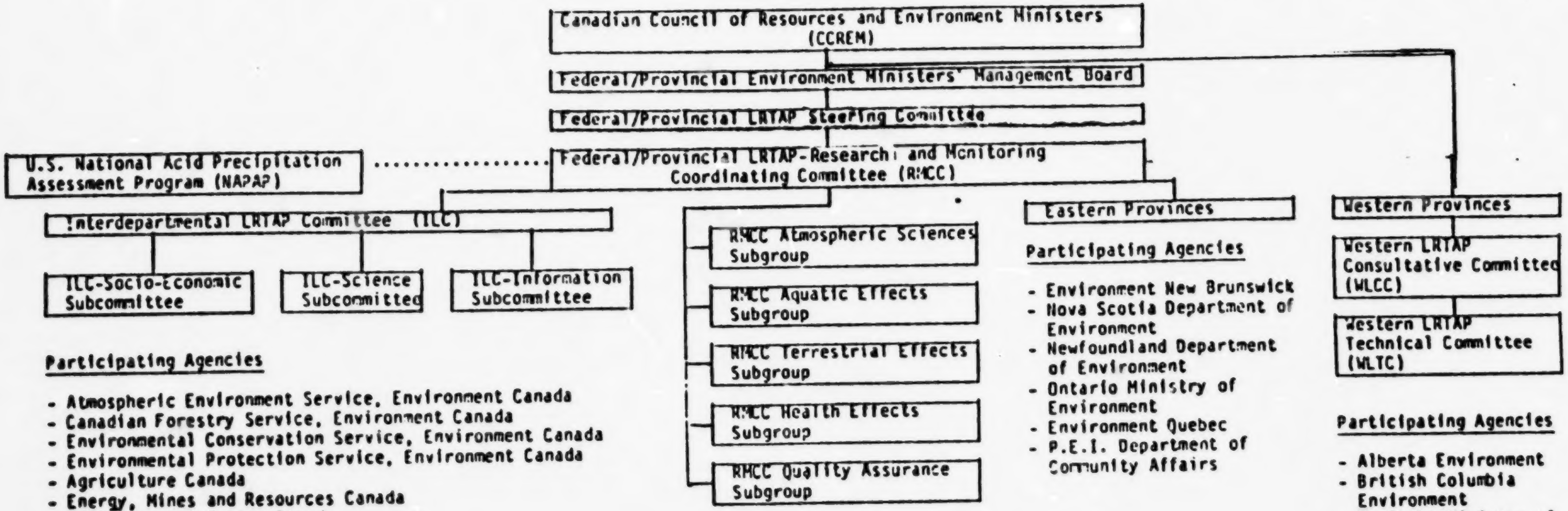
Domestic concerns about acid rain were first focussed by federal-provincial discussions convened under the Canadian Council of Resource and Environment Ministers. Through that forum, a coordinating network was formed to exchange information, coordinate research programs, work towards agreements to reduce domestic emissions and support efforts to encourage the United States to take similar measures.

As shown in Table 14.1, the arrangements include a Federal-Provincial LRTAP Steering Committee, an Acid Rain Research and Monitoring Coordinating Committee and separate working committees for eastern and western provinces. A common federal link among all research and monitoring efforts is Environment Canada's assistant deputy minister, Atmospheric Environment Service, who co-chairs the Research and Monitoring Committee and chairs the eastern and western working groups.

In early February 1985, agreement was reached by ministers to reduce LRTAP emissions to target levels within an agreed time frame. The agreement includes the federal government and all provinces east of Saskatchewan, and provides for reductions of 50 percent of 1980 sulphur dioxide emission levels from power plants and smelters by 1994.

Table 14.1

LRTAP COMMITTEE STRUCTURE


Canadian Council of Resources and Environment Ministers (CCREM)
Federal/Provincial Environment Ministers' Management Board
Federal/Provincial LRTAP Steering Committee
Federal/Provincial LRTAP-Research and Monitoring Coordinating Committee (RMCC)
U.S. National Acid Precipitation Assessment Program (NAPAP)
Interdepartmental LRTAP Committee (ILC)
ILC-Socio-Economic Subcommittee
ILC-Science Subcommitted
ILC-Information Subcommittee
RMCC Atmospheric Sciences Subgroup
RMCC Aquatic Effects Subgroup
RMCC Terrestrial Effects Subgroup
RMCC Health Effects Subgroup
RMCC Quality Assurance Subgroup
Eastern Provinces
Western Provinces
Western LRTAP Consultative Committee (WLCC)
Western LRTAP Technical Committee (WLTC)

Participating Agencies

- Atmospheric Environment Service, Environment Canada
- Canadian Forestry Service, Environment Canada
- Environmental Conservation Service, Environment Canada
- Environmental Protection Service, Environment Canada
- Agriculture Canada
- Energy, Mines and Resources Canada
- Fisheries and Oceans Canada
- Health and Welfare Canada
- External Affairs Canada

Participating Agencies

- Environment New Brunswick
- Nova Scotia Department of Environment
- Newfoundland Department of Environment
- Ontario Ministry of Environment
- Environment Quebec
- P.E.I. Department of Community Affairs

Participating Agencies

- Alberta Environment
- British Columbia Environment
- Manitoba Ministry of Environment, Work Place Safety & Health
- Saskatchewan Environment
- Northwest Territories Renewable Resources

At the federal level, responsibilities for developing LRTAP control strategies rests with Environment Canada's Environmental Protection Service, while the Atmospheric Environment Service is responsible for coordinating federal research and monitoring programs. An Interdepartmental LRTAP Committee (ILC), chaired by the assistant deputy minister, Atmospheric Environment Service while focussing on research and monitoring, is responsible for:

(a) reviewing program plans of participating departments to ensure effective coordination of efforts;

(b) reviewing results of scientific and technical programs to ensure continuing coordination and to assess implications for control strategies;

(c) receiving reports on progress in federal-provincial and international negotiations and revising scientific programs as needed to meet requirements of control strategies;

(d) reviewing and ensuring coordination of interdepartmental public information programs on LRTAP; and,

(e) advising ministers on the above matters as required.

A small LRTAP Liaison Office, reporting to the chairman of the ILC, has been set up to:

(a) provide information and advice to elected officials and senior management on scientific matters and policies arising therefrom relating to Canada-U.S. and federal-provincial negotiations convering transboundary air pollution;

(b) evaluate, coordinate and monitor federal programs; and,

(c) maintain liaison with U.S. and provincial counterparts.

Departments represented on the ILC are Environment; Fisheries and Oceans; National Health and Welfare; Agriculture; Forestry; Energy, Mines and Resources; and External Affairs. Environment's representation includes three sectors of the Department: Atmospheric Environment Service, Environmental Protection Service, and the Environmental Conservation Service. The latter contains the Inland Waters Directorate and Canadian Wildlife Service whose research and monitoring programs contribute to the aquatic component of the acid rain program.

The major aquatic programs of the federal agencies include the following monitoring and research categories:

DOE - IWD monitoring of water quality trends in acidification and metals concentrations including seasonal impacts of spring snow melt; surveys of water chemistry and phytoplankton

watershed studies of susceptible lakes to examine historical trends through sediment core analysis; current trends in water chemistry and biology in relation to atmospheric deposition on calibrated watersheds

modelling to relate atmospheric deposition to aquatic acidification and to attempt prediction of future effects

paleoecological studies to determine historic changes in the acidity of selected lakes

geochemical studies of the behaviour of specific metals in lakes, peatland drainages, etc.

DOE - CWS biological studies to relate the acidification and heavy metal mobilization on waterfowl and water-frequenting animals

DFO - surveys of chemistry and biology in lakes and streams sensitive to acid rain with emphasis on salmon rivers and trout bearing lakes

watershed studies to determine mechanisms and trends of acidification and the related effects on fish and food chain components

biological studies to determine toxic effects of specific levels of acidification and metals concentrations on fish species

remedial studies to develop and test liming techniques to counter acidification and preserve genetic stocks pending controlled reduction of acid rain levels

NHW - assessment of the implications of acidification and metals mobilization on drinking water sources; assessment of acidic waters on eyes of swimmers.

In 1983-84, total federal resources expended on the LRTAP program amounted to some $15,735,000 and 214 person-years. The aquatic component accounted for about 43% of the total. The remainder was made up largely of atmospheric emissions monitoring, inventory, control measure development, and air quality health implication studies.

Estimates of the financial and manpower resources to the aquatic component of the LRTAP program are outlined in Table 14.2.

Table 14.2

FEDERAL LRTAP RESOURCES
Aquatic Component

	80-81		81-82		82-83		83-84		84-85	
AGENCY	$000	P-Y	$000	P-Y	$000	P-Y	$000	P-Y	$000	P-Y
DOE-IWD	255	8.1	570	12.9	1,185	24.5	1,204	25.2	1,192	26.8
DOE-CWS	680	10.2	803	11.2	662	10.5	680	9.5	823	9.3
DFO	2,502	35.0	4,400	48.4	4,539	55.0	4,772	58.1	4,000	54.0
NHW*	22	0.1	38	0.2	44	0.5	51	2.0	27	0.5

* Drinking water component only; aquatic total may be higher.

14.4 Comment

A review of the federal LRTAP research programs was completed early in 1984 by the Royal Society of Canada. General satisfaction was expressed for the aquatic program. Some projects involving experimental acidification of lakes to determine ecological effects were considered to be world leaders.

On the other hand, the Society made a number of observations that were critical:

(a) the program objectives were considered too general to guide the definition of research programs;

(b) some departments had developed strong well-managed programs while others had not;

(c) fiscal funding uncertainties created difficulties for planning, execution and continuity of research;

(d) the aquatic component was inadequately coordinated with the atmospheric component;

(e) review, assessment and synthesis of project results required strengthening; and,

(f) the socio-economic studies were weak.

Each of these criticisms may be traced to the Royal Society's most significant observation. No single agency or individual has been given the authority necessary to make the program operate effectively. The Society recommended that:

> "Overall control over the LRTAP program be sharply increased with authority for funding concentrated in some lead agency."[1]

The multi-faceted nature of the LRTAP problem signals the obsolescence of the traditional natural resource management categories of water, air, forest and agriculture when quality is at issue. It explains the adoption of new interdepartmental approaches based on issues rather than on the management of individual resources. The Interdepartmental Committee on LRTAP, however, is a typical example of the federal government's well-intentioned but less than perfect approach to coordinating its internal affairs. Its tasks are to review programs, effect coordination and advise ministers; but it has no teeth. Its tools, or those of Environment Canada that chairs it, are limited to good will and persuasion.

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[1] Royal Society of Canada, 1984. Long-Range Transport of Airborne Pollutants in North America: A Peer Review of Canadian Federal Research. (p.12)

In the end, each minister is sovereign when selecting among priorities within his mandate and when seeking supplementary resources to participate in new initiatives like the LRTAP program. The final results are often something less than ideal, as the Royal Society's observations attest. A well-balanced LRTAP program has yet to emerge.

During the course of the current review, the same basic problem identified by the Royal Society became apparent. Concerns were expressed over the relative distribution of supplementary resources available to the research programs of the various agencies. While some excellent cooperation exists, there remains a need for a more comprehensive and integrated federal program.

In some cases, there has been uncertainty of continuing funding from year to year. In one situation, Fisheries and Oceans did not obtain required resources until well into the fiscal year in which they were required.

It is time to break away from tradition and adopt a more business-like approach. Responsibility centres must be given the authority to achieve what is expected of them. Once the Government has identified a new priority issue with interdepartmental dimensions that is amenable to reasonably short-term solution, overall responsibility for it should be assigned to one minister whose authority should extend to comprehensive problem definition, program development and the control of supplementary resources that may be required by various departments to contribute to the program. Assignment of authority in this fashion would, of course, extend down to interdepartmental committees advising the responsible minister. While a committee's success would remain largely dependent on good will and persuasion, a chairman's control over supplementary resources would go a long way in ensuring the desired degree of cooperation.

The lead department would, in effect, be able to purchase the required extra services from other departments that could not supply them through their regular budgets.

While acid rain may affect health and the management of many resources, Environment Canada remains the most appropriate centre for federal responsibility. The Department is responsible for developing the federal government's pollution control atrategies and carries the federal government's responsibilities for atmospheric, water and wildlife management.

> IT IS RECOMMENDED that Environment Canada's lead role respecting LRTAP be redefined to encompass authority for:
>
> (a) developing comprehensive research and technical plans that integrate the programs and resources of all departments,
>
> (b) seeking supplementary funding and staff that may be required to implement the identified program needs, and
>
> (c) allocating supplementary funding and staff that may be made available to implement approved programs.

The Minister of Environment would be identified as the Minister responsible for dealing with the LRTAP problem, and the Interdepartmental Committee on LRTAP would report to and advise that Minister.

To assist the Chairman of the Interdepartmental Committee:

> IT IS RECOMMENDED that the Interdepartmental Liaison Office on LRTAP be redesignated as the LRTAP Secretariat or Office, reporting to the Chairman and drawing its coordinating authority from his.

15. CONCLUDING COMMENT

15. CONCLUDING COMMENT

Briefs submitted to the Inquiry on Federal Water Policy identified both current critical problems and anticipated ominous issues. The first group are primarily related to water quality, led by toxic chemicals and acid rain. The second group centre on anticipated water shortages from the combined effects of increasing consumptive uses and climatic change. It raises questions concerning conservation practices, the propriety of supporting new irrigation schemes in the west, the need for understanding with the U.S. to limit and share consumptive uses of the Great Lakes, and the specter of massive diversions of water from one basin to another.

The topic selection and recommendations in this review have been designed to address these two categories of need, the preparations necessary to deal with anticipated problems and the resolution of existing priority issues. Thus the focus on maintaining and strengthening, planning and intergovernmental arrangements on the one hand and taking action on toxic substances, acid rain and the Great Lakes program on the other.

Unfortunately, it has not been possible to tally up the totals of federal funds and personnel dedicated to water management. Fisheries and Oceans could not differentiate resources assigned to fish habitat management from those dedicated to fish. The Environmental Protection Service of Environment Canada find it difficult to sub-divide resources applied to a particular issue, such as toxic chemicals control, into water, air or land management activities. Such statistics that are available are given in Appendices I-IV.

Environment Canada is the federal government's principal water manager. In 1984-85, the Inland Waters Directorate budgeted for about $112 million with 1,056 person-years of employment. If one may assume that about three-quarters of the Environmental Protection Service's effort goes toward water quality, then its 1984-85 figure would be $56 million and 575 person-years. The Canadian Wildlife Service's important contributions to the toxic substances and acid rain programs were expected to amount to some $1.5 million and 20 person-years. In total then, Environment Canada devoted in the order of $170 million and 1,650 person-years to water management in Canada.

National Health and Welfare dedicated approximately $4.5 million and 71 person-years to programs related directly to water quality.

Agriculture Canada budgeted $2.5 million and 47 person-years to water research for agriculture.

The total expenditures of these management oriented agencies for 1984-85 was about $177 million and 1,770 person-years.

These figures do not include resources budgeted for by developer/user agencies such as Regional Industrial Expansion or PFRA. PFRA, for example, has 1984-85 estimates for water development operations of some $42 million and 660 person-years. A portion of the $42 million was provided under economic regional development agreements.

In an unclear jurisdictional situation, Environment Canada has found a reasonable way to work in cooperation with the provinces to the advantage of both. This is demonstrated through agreements for water quantity and quality networks.

the flood damage reduction program, the Great Lakes Water Quality program, and to a lesser degree, through the accords on environmental protection.

Considerably more attention must be dedicated to current water quality issues. In particular, it is essential that the Environmental Contaminants Act be amended to provide for an efficient registration system of potentially toxic substances, so that their use may be controlled or prevented. The International Joint Commission was blunt in its recommendation to Canada and the U.S. in 1980 that: "... the production, sale, transport or use of persistent synthetic organic compounds with known highly toxic effects whose use will result in their entry into the environment be prohibited". Canada is not acting quickly enough.

In light of the restricted resources available to both the federal and provincial governments, every opportunity should be explored for closer federal-provincial collaboration on problems of mutual concern. Cost-sharing and work-sharing agreements on specific water quality issues might be modelled after the water monitoring agreements already in place.

Fisheries and Oceans might consider the same approach to extricate itself from the dilemna of how to implement its fish habitat policy, particularly in those provinces that administer the Fisheries Act.

Within the federal government, Environment Canada must clarify for itself, and other departments, first what its role should be. If it is to be what it should be, the quasi-water manager, then its role is to establish, carry out and coordinate the policies and programs of other federal agencies related to water research, planning, monitoring, allocation and regulation. It should not become involved as a water resource developer as this would place it in a serious conflict of interest situation of judging on its own water use proposals.

The relationship of Environment Canada to those federal agencies that are the proponents of water development needs particular clarification. If a development agency desires a regional assessment of the development potential of water for example, it should turn to Environment Canada to develop the appropriate arrangements with the provinces involved. With respect to individual development proposals, however, the situation is more complex. In its quasi-water allocation role, Environment Canada can do two things. First, it can ensure that the socio-economic assessments of development proposals are performed to meet a set of formally established criteria. Second, it can advise on the relative merits or implications of a proposal, that is to say, for example, it could advise that an irrigation scheme in Alberta might be less productive than allowing the water to run through a hydroelectric plant downstream. The decision, however, would and should remain with the province in cooperation with the federal development agency involved.

From time to time, as new priority issues evolve, governments find it useful to re-organize their bureaucracies. The position put forward here is that whatever organization is contemplated, it is important to maintain a separation between the water management agemcy and the proponents of development.

Water prevades the interests of so many agencies that perhaps the real challenge is to find and adopt a more businesslike approach to government -- one that includes greater delegation of authority and responsibility to individual ministers.

Once a priority issue amenable to short-run solution has been identified, it should be assigned to a minister along with enough interdepartmental clout to effect a solution. The clout should include whatever supplementary resources are to be assigned to the problem.

APPENDIX I

INLAND WATERS DIRECTORATE

RESOURCES BY PROGRAM

	82-83		83-84		84-85	
	$000	P/Y	$000	P/Y	$000	P/Y
1.1	10913.7	160.8	18102.7	143.0	32065.0	150.2
1.2	12005.0	37.0	5451.7	38.8	3270.1	38.5
1.3	7522.0	62.8	9666.8	86.2	10718.0	106.4
1.4	29700.6	359.9	34047.8	343.2	36418.7	359.2
1.5	12447.0	193.2	12161.9	183.7	12953.7	187.7
1.6	44132.3	126.5	29143.4	126.1	8256.3	107.4
4.1	4021.9	67.1	4201.0	65.9	4886.7	68.1
4.2	4473.2	29.6	2912.1	28.6	2271.1	25.2
4.3	786.0	13.2	1139.0	14.6	1174.7	13.8
TOTALS	126001.7	1050.0	116826.4	1030.0	112014.3	1056.0

1.1	Canada-U.S. and Interjurisdictional
1.2	Flood Damage Reduction
1.3	Water Quality Data
1.4	Water Quantity Data
1.5	Research
1.6	Management and Administration
4.1	Toxic Chemicals
4.2	Long Range Transport and Air Pollutants
4.3	Environmental Assessment

APPENDIX 1

INLAND WATERS DIRECTORATE
ENVIRONMENT CANADA

RESOURCES BY PROGRAM

Headquarters (Hull)

CODE	82-83		83-84		84-85	
	$,000.	P/Y	$,000.	P/Y	$,000.	P/Y
1.1	2709.2	45.6	13565.8	51.9	26663.6	55.1
1.2	338.4	11.9	549.0	11.9	500.0	11.0
1.3	712.3	13.9	2760.2	35.6	3967.4	59.6
1.4	1985.5	32.0	2224.8	25.2	3271.3	32.2
1.5	432.1	3.0	489.6	3.0	871.7	5.0
1.6	37439.7*	39.0	22436.5*	38.0	1682.0	28.0
4.1	22.0	0.5	207.3	5.4	207.3	5.4
4.2	53.5	1.0	114.0	1.7	123.6	2.0
4.3	44.5	0.6	6.0	0.4	24.7	0.4
TOTALS	43737.2	147.5	42353.2	173.1	37311.6	198.7

*contains Great Lakes sewage treatment grants.

Research Institutes

1.1	759.0	19.0	843.0	19.0	1050.0	22.0
1.2	--	--	--	--	—	--
1.3	275.0	5.0	316.0	6.0	324.0	5.0
1.4	125.0	3.0	146.0	3.0	154.0	3.0
1.5	10786.0	170.7	10447.0	162.0	10584.0	164.0
1.6	4202.0	51.0	4098.0	52.0	4056.0	47.9
4.1	2219.0	46.0	2500.0	48.7	2797.0	47.8
4.2	991.0	18.3	917.0	18.0	694.0	15.0
4.3	48.0	1.0	100.0	2.3	107.0	2.3
TOTALS	19405.0	314.0	19367.0	311.0	19766.0	307.0

Atlantic Region

1.1	391.5	10.1	585.6	13.6	620.9	13.9
1.2	251.5	6.5	250.9	5.3	291.3	6.2
1.3	508.0	11.7	543.1	11.4	472.8	9.4
1.4	1545.9	31.6	1609.3	30.8	1873.9	31.8
1.5	11.3	0.2	8.6	0.2	9.0	0.2
1.6	309.3	8.0	283.2	7.0	295.3	7.0
4.1	220.9	5.7	158.7	3.7	254.0	5.7
4.2	174.9	4.5	193.0	4.5	200.6	4.5
4.3	27.3	0.7	68.5	1.6	26.7	0.6
TOTALS	3440.6	79.0	3700.9	78.1	4044.5	79.3

Québec Region

CODE	82-83		83-84		84-85	
	$,000.	P/Y	$,000.	P/Y	$,000.	P/Y
1.1	536.0	1.3	443.0	1.2	866.0	1.9
1.2	5640.0	1.3	3776.0	2.3	1071.0	2.2
1.3	4396.0	9.5	4427.0	8.5	4485.0	8.7
1.4	10761.0	5.5	13043.0	5.5	13383.0	6.6
1.5	—	—	—	—	—	—
1.6	933.0	2.3	770.0	2.0	1020.0	2.0
4.1	1125.0	1.3	839.0	1.2	1129.0	1.2
4.2	3169.0	3.8	1665.0	3.7	1230.0	3.0
4.3	387.0	0.8	609.0	1.6	577.0	1.4
TOTALS	26947.0	25.8	25572.0	26.0	23761.0	27.0

Ontario Region

1.1	3233.5	46.6	1101.8*	21.4*	1225.5	22.8
1.2	872.9	3.7	191.6	4.8	226.9	4.8
1.3	—	—	—	—	—	—
1.4	2319.4	46.5	2421.9	47.1	2718.7	49.0
1.5	—	—	—	—	—	—
1.6	336.8	5.0	482.2	7.6	236.8	3.8
4.1	172.9	4.0	140.2	2.9	216.8	4.0
4.2	42.4	1.0	23.1	0.7	22.9	0.7
4.3	177.1	3.7	154.7	3.0	176.6	3.4
TOTALS	7155.0	110.5	4515.5	87.5	4824.2	88.5

*Decrease due to centralization of water quality laboratory services to HQ.

West and North Region

1.1	1880.5	25.2	1130.4	25.1	1192.5	24.5
1.2	870.6	7.9	347.0	6.6	326.3	6.3
1.3	907.6	11.8	1008.0	14.1	758.5	12.6
1.4	8613.4	162.8	9675.9	154.6	9792.7	158.6
1.5	446.5	7.4	509.1	7.0	468.3	7.0
1.6	506.9	13.4	521.4	10.5	525.2	10.0
4.1	197.5	6.2	88.5	1.0	107.5	1.0
4.2	—	—	—	—	—	—
4.3	95.5	3.4	158.1	3.0	153.2	3.0
TOTALS	13518.5	238.1	13438.4	222.0	13324.2	223.0

Pacific and Yukon Regions

1.1	1404.0	13.0	433.1	10.8	556.5	10.5
1.2	4026.6	5.7	337.2	7.9	354.6	8.0
1.3	723.1	10.9	612.5	10.6	710.3	11.1
1.4	4350.4	78.5	4924.9	77.0	5225.1	78.0
1.5	779.1	11.9	707.6	11.5	720.7	11.5
1.6	314.6	7.8	552.1	9.0	441.0	8.7
4.1	64.6	3.4	158.3	3.0	175.1	3.0
4.2	—	—	—	—	—	—
4.3	6.6	3.0	105.3	2.7	109.5	2.7
TOTALS	11669.0	134.2	7831.0	132.5	8292.8	133.5

APPENDIX 2

ENVIRONMENTAL PROTECTION SERVICE
ENVIRONMENT CANADA
RESOURCES BY PROGRAM

1983-84

	1 $	2 $	3 $	4 $	5 $	6 $	7 $	TOTAL $
Headquarters	9,581,342	3,494,250	1,771,131	1,479,498	4,681,900	2,111,158	12,406,107	35,525,386
Regions:								
Atlantic	737,023	220,029	668,263	295,765	1,552,379	556,914	887,543	4,917,826
Québec	1,193,583	75,246	473,100	218,757	393,951	324,205	628,793	3,307,635
Ontario	1,194,227	58,768	144,021	58,824	360,372	647,675	10,326	2,474,213
W & N	617,254	156,646	1,239,290	469,067	1,390,353	720,472	302,499	4,895,581
Pacific	1,313,818	37,214	113,732	538,226	1,215,995	756,220	925,930	4,901,135
TOTAL(regions)	5,055,905	547,903	2,638,406	1,580,649	4,913,050	3,005,486	2,755,091	20,496,391
GRAND TOTAL	14,637,247	4,042,153	4,409,537	3,060,047	9,594,950	5,116,644	15,161,198	56,021,777
PERSON YEARS	99	36	631					766

CODE
1 Corporate Guidance
2 Priority Issues Directorate
3 Assessment & Remedial Measures
4 Commercial Chemicals Management
5 Control of Threats
6 Waste Management
7 Technical Services

1980-81

	1 $	2 $	3 $	4 $	5 $	6 $	7 $	8 $	9 $	TOTAL $
HQ	75,202	9,805,732	5,812,086	2,997,558	2,658,274	673,059	794,558	715,723	1,650,913	25,183,105
Regions:										
Atlantic	—	2,589,457	120,524	485,715	68,186	72,011	76,520	1,546	18,604	3,423,563
Québec	—	846,745	148,742	452,533	70,113	146,911	90,075	2,412	36,455	1,793,986
Ontario	—	1,218,220	37,555	129,560	33,778	95,278	94,053	—	61,582	1,670,026
Northwest	—	2,387,993	27,333	367,023	77,263	133,960	32,850	—	51,180	3,077,602
Pacific	—	2,599,878	21,632	380,214	52,830	74,590	47,316	—	16,688	3,193,148
TOTAL REGIONS	—	9,633,293	355,786	1,815,045	302,170	522,750	340,814	3,958	184,509	13,158,325
GRAND TOTAL	75,202	19,439,025	6,167,872	4,812,603	2,960,444	1,195,809	1,135,372	719,681	1,835,422	38,341,430
PERSON YEARS	-	140	155	233	46	78	64	-	31	747

Code
1 Toxic Chemical
2 Management & Common Support
3 Air Pollution
4 Water Pollution
5 Enviornmental Emergencies
6 Federal Activities
7 Contaminants Control
8 Environmental Contaminants Control Fund
9 Waste Management

NOTE: 1) Source - Statement #60001 on Microfiche #100 for p.15, 1980/81

1981-82

	1 $	2 $	3 $	4 $	5 $	6 $	7 $	8 $	TOTAL $
HQ	16,161,208	1,969,291	2,372,237	221,251	784,242	1,699,027	914,033	4,708,486	28,829,775
Regions:									
Atlantic	2,878,826	392,559	66,032	104,667	68,501	34,028	6,425	145,924	3,696,962
Québec	250,323	848,315	149,122	172,549	171,765	83,663	—	435,300	2,111,037
Ontario	1,315,598	173,065	33,954	47,835	50,895	70,402	536	238,914	1,931,199
Northwest	2,364,523	354,152	100,723	239,868	72,264	28,148	9,303	393,635	3,562,616
Pacific	1,970,923	599,087	109,643	50,407	62,965	16,594	—	938,790	3,748,409
TOTAL REGION	8,780,193	2,367,178	459,474	615,326	426,390	232,835	16,264	2,152,563	15,050,223
GRAND TOTAL	24,941,401	4,336,469	2,831,711	836,577	1,210,632	1,931,862	930,297	6,861,049	43,879,998
PERSON YEARS	159	233	46	78	64	31	—	140	751

Code
1 Air Pollution
2 Water Pollution
3 Environmental Emergencies
4 Federal Activities
5 Waste Management
6 Contaminants Control
7 Toxic Chemical
8 Management and Common Support

NOTE: 1) Source - Statement #60001 P.15 Microfiches 124 & 125

1982-83

	1 $	2 $	3 $	4 $	5 $	6 $	7 $	8 $	TOTAL $
Headquarters	7,115,394	7,462,090	3,286,802	1,187,216	2,871,445	1,865,640	701,732	5,858,969	30,349,288
Regions:									
Atlantic	123,615	440,990	120,935	91,871	44,218	190,996	--	3,241,051	4,253,676
Québec	236,177	880,685	174,839	229,003	155,560	336,707	—	949,678	2,962,649
Ontario	94,900	198,858	28,896	102,181	170,310	30,015	260,799	1,429,077	2,315,036
Northwest	281,159	1,558,579	370,044	690,469	131,341	370,974	—	731,399	4,133,965
Pacific	187,005	1,952,794	231,890	329,025	39,852	311,693	--	1,321,553	4,373,812
TOTAL(regions)	922,856	5,031,906	926,604	1,442,549	541,281	1,240,385	260,799	7,672,758	18,039,138
GRAND TOTAL	8,038,250	12,493,996	4,213,406	2,629,765	3,412,726	3,106,025	962,531	13,531,727	48,388,426
PERSON YEARS	153	240	48	66	40	59	8	151	765

Code
1 Air Pollution
2 Water Pollution
3 Environmental Emergencies
4 Federal Activities
5 Waste Management
6 Contaminants Control
7 Toxic Chemical
8 Management and Common Support

NOTE (1) Source - Statement #60001 on Microfiche #135 for p.16, 1982-1983.

APPENDIX III

HEALTH PROTECTION BRANCH
NATIONAL HEALTH AND WELFARE

RESOURCES BY PROGRAM

	82-83		83-84		84-85	
	$000	P/Y	$000	P/Y	$000	P/Y
Drinking Water	723.0	8.7	1007.0	11.6	752.0	10.2
Acid Rain (Drinking water component)	44.0	0.5	51.0	2.0	27.0	0.5
Environmental Contaminants	1750.0	31.5	2547.0	31.9	2562.0	31.6
Great Lakes	200.0	N.A.	200.0	N.A.	200.0	N.A.
Pesticides*	674.0	11.5	990.0	17.0	1132.0	28.8

*Relates to health and all resources.

APPENDIX IV*

FISHERIES AND OCEANS
EXPENDITURES BY REGION

FISHERIES MANAGEMENT **Category a)**
($000's)

REGION	**80/81**	**81/82**	**82/83**	**83/84**	**84/85**
	1,855	2,204	2,744	2,619	2,912
Newfoundland	30	49	65	62	66
Scotia/Fundy	3,703	5,095	4,501	4,368	4,217
Gulf	- Region nonexistent -		2,264	2,770	2,672
Ontario	1,954	2,224	2,973	2,965	2,768
Western	6,079	6,691	6,412	6,950	8,331
Pacific	3,048	4,002	4,616	5,657	6,210
Headquarters	226	295	394	482	499
GRAND TOTAL	16,895	20,560	23,969	25,873	27,675

a) Expenditures in the freshwater and anadromous areas of the Fisheries Research Branches in all Fisheries Management regions (also includes aquaculture, stock and habitat enhancement and rehabilitation).

*All figures provided by Fisheries and Oceans -- no catagorization possible into "water" and "fish".

APPENDIX IV

FISHERIES MANAGEMENT (\$000's)   Category b)

REGION	80/81	81/82	82/83	83/84	84/85
	84	116	97	147	160
Newfoundland	15	23	24	22	19
Scotia/Fundy	435	451	189	179	166
Gulf	- Region nonexistent -		1,126	1,301	1,333
Ontario	1,949	1,942	2,219	2,575	2,763
Western	6,363	6,681	11,159	11,430	11,591
Pacific	46,543	51,684	50,194	53,470	52,007
Headquarters					
GRAND TOTAL	55,389	60,897	65,008	69,124	68,039

b) Expenditures in the freshwater and anadromous areas of the Fisheries Operations Branches in all Fisheries Management regions (also includes aquaculture, stock and habitat enhancement and rehabilitation).

OCEAN SCIENCE & SURVEYS
($000's)

	Category c)					Category d)				
REGION	**80/81**	**81/82**	**82/83**	**83/84**	**84/85**	**80/81**	**81/82**	**82/83**	**83/84**	**84/85**
ATLANTIC	10	10	10	10	10	312	312	442	526	526
QUEBEC	705	180	840	364	560	–	54	46	53	56
CENTRAL	7000	7000	7000	7000	7000					
HQ	410	420	450	550	600					
PACIFIC	135	89	87	69	214					
GRAND TOTAL	8,260	7,699	8,387	7,993	8,384	312	366	488	579	582

						Category f)				
ATLANTIC						590	621	621	621	621
QUEBEC										
CENTRAL										
HQ										
PACIFIC						90	98	90	115	230
GRAND TOTAL						680	719	711	736	851

c) Expenditures related to freshwater charting made by Oceans Science and Surveys.

d) Expenditures related to freshwater regulation and chemical hazards (also includes acid rain and toxic chemicals) made by Ocean Science and Surveys.

f) Other – expenditures in the freshwater and anadromous areas in Support Services Branches including ships.

APPENDIX IV

FISHERIES MANAGEMENT (\$000's) Category e)

REGION	80/81	81/82	82/83	83/84	84/85
Newfoundland					
Scotia/Fundy	-	2	16	27	5
Gulf	- Region nonexistent -				
Quebec					
Ontario	3,862	3,729	4,733	17,607	20,083
Western	1,026	700	971	807	715
Pacific	128	16	101	461	63
Headquarters					
GRAND TOTAL	5,016	4,447	5,821	18,902	20,866

e) Expenditures on the construction and maintenance of harbours in freshwater made by Small Craft Harbours.

APPENDIX IV

FISHERIES MANAGEMENT **Category f)**
($000's)

REGION	80/81	81/82	82/83	83/84	84/85
Newfoundland					
Scotia/Fundy					
Gulf	- Region nonexistent -				
Quebec					
Ontario					
Western	-	-	-	-	420
Pacific	11,446	12,326	18,321	23,619	20,427
Headquarters					
GRAND TOTAL	11,446	12,326	18,321	23,619	20,847

f) Other - expenditures in the freshwater and anadromous areas in Support Services Branches including ships.

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STUDY TERMS OF REFERENCE

Ojectives:

The objectives of this project are to describe the administration of water resources by the federal government; and to evaluate the effectiveness of federal water administration in relation to jurisdiction, to various policies and programs, and to their coordination.

Tasks:

1. In consultation with federal officials, determine the mandate of each agency against its legislative base, and the degree to which it shares its responsibilities with other federal agencies and with other jurisdictions.

2. For each agency, review and assess the adequacy/appropriateness of its (a) legislation, (b) policies, (c) programs, and (d) financial and human resources, in relation both to agency mandate and to current/emerging issues of water management. (To what degree have these factors changed in the last 5 years? What further changes are planned?)

3. Analyze the formal and informal mechanisms which have evolved to effect coordination of federal water programs, and to enhance cooperation with provinces.

4. Recommend appropriate measures for improving the effectiveness of federal water administration, including but not limited to legislative, program and organizational change.

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